Advanced MANAGEMENT

In This Issue...

RECEIVED
SEP 4 1956
UNIV. OF MARYLAND LIBRARY

The Four R's of Management
by John L. McCaffrey

Tackling Old Problems With New Tools from Operations Research
by John M. Allderige

Man and Automation
by Walter H. Johnson

Substantive Decentralization in the Large Corporation
by Waino W. Suojanen

Use of Sales Quotas by Manufacturers
by Donald R. Herzog

Remington Rand

BETTER BUSINESS METHODS

For Greater Profits Through Lower Costs

Electronics Speed Production Control

Parts requirements scheduling . . .

for ten or more periods can now be computed and punched in a single card pass through the Univac* 120. Schedule cards for each end-product are collated with their related parts requirements cards, and the Univac 120 computes, checks and punches complete requirement figures for ten or more periods. This is done at a full 150 c.p.m., and in just a single card pass.

A 6-page folder showing actual program charts will be sent free on request. Circle TM1073.

*Registered in the U.S. Patent Office

Materials control for assembly lines.

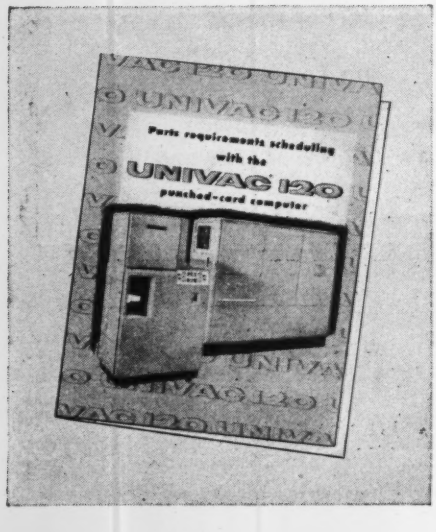
The Univac File-Computer now makes it possible to go directly from production plans to vendor delivery schedules in less than 1% of the time previously required. This system provides: completely automatic scheduling of deliveries by weeks for the next two months, by months for third month and later periods; adequate working stocks – no overstocks, no rush orders.

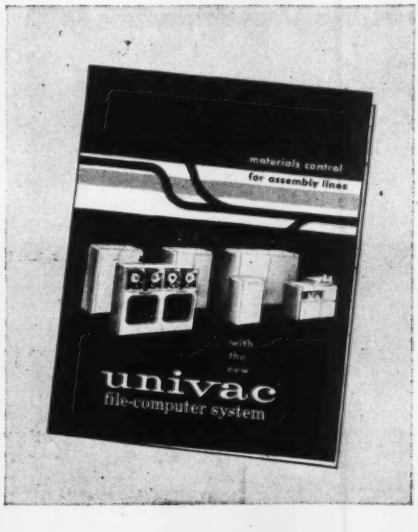
You get complete details in a 6-page folder that will be sent free on request. Circle TM987 on the coupon below.

Production scheduling.

Regardless of the number of departments or products involved, SCHED-U-GRAPH tells you immediately – simply and visually – the status of all orders. A quick glance at SCHED-U-GRAPH and you know at once *where* the work is and *when* you can deliver. And you can schedule new orders promptly and accurately, with assurance that promised delivery dates will be met. The success of SCHED-U-GRAPH is directly proportional to the problems involved . . . the greater the problems, the greater the success of SCHED-U-GRAPH.

A 4-page folder will be sent free on request. Circle CH1049.





Remington Rand

DIVISION OF SPERRY RAND CORPORATION

Room 1964 315 Fourth Ave., New York 10

Yes, I'd like to have the literature circled.

TM1073 TM987 CH1049

Name_____

Company_____

Address_____

City_____ Zone____ State_____

000

Profit-Building **IDEAS** For Business

ADVANCED MANAGEMENT

SEPTEMBER 1956
VOLUME 21 NO. 9

Production Editor: Beatrice Jones

PUBLICATIONS COMMITTEE

JAMES J. BAMBRICK, Jr., Labor Relations Specialist, National Industrial Conference Board, 460 Park Avenue, N. Y. C.

EDWARD SCHULTZ, Director of Personnel, R.C.A. Laboratories, Radio Corporation of America, Princeton, N. J.

AL N. SEARES, Vice President, Remington Rand Inc., 315 Fourth Avenue, N. Y. C.

NATIONAL OFFICERS: 1956-1957

Chairman of the Board—F. F. BRADSHAW, President, Richardson, Bellows, Henry & Co., New York, N. Y.

President—JOHN B. JOYNT, Manager, Management Services Dept., American Enka Corporation, Enka, N. C.

1st Vice President—HOMER E. LUNKEN, Vice President, Lunkenheimer Co., Cincinnati, Ohio

2nd Vice President—J. RICHARD JEFFREY, The Jeffrey Manufacturing Co., Columbus, Ohio

Secretary—DAUSE L. BIBBY, Executive Vice President, Daystrom, Inc., Elizabeth, New Jersey

Treasurer—JAMES E. NEWSOME, Johnson & Johnson, Chicago, Illinois

Executive Vice President—HAROLD R. BIXLER.

Vice President of Civic Affairs—GEORGE M. GOETTELMAN, Johnson & Johnson, New Brunswick, N. J.

Vice President, Distribution—AL N. SEARES, Vice President, Remington Rand, Inc., New York, N. Y.

Vice President of Industrial Engineering—RALPH M. BARNES, Professor of Engineering & Production Management, University of California, Los Angeles, Calif.

Vice President, Management Research and Development—RALPH C. DAVIS, College of Commerce & Administration, Ohio State University, Columbus, Ohio

Vice President, Membership—PHIL CARROLL, Professional Engineer, Maplewood, N. J.

Vice President, Seminars—LESTER F. ZERFOSS, Staff Advisor for Executive Development, American Enka Corp., Enka, N. C.

Vice President, Senior Chapter Operations—J. RICHARD JEFFREY, The Jeffrey Manufacturing Co., 1st Ave. and 4th St., Columbus, Ohio

Vice President, University Chapter Operations and Development—HAROLD FISCHER, Professor of Business Administration, Franklin & Marshall College, Lancaster, Pa.

Vice President, Central Region—J. BRUCE McNAUGHTON, The Jeffrey Manufacturing Co., Columbus, Ohio

Vice President, Middle Atlantic Region—BRUNO A. MOSKI, Director, Industrial Engineering, Yale & Towne, Philadelphia

Vice President, North Central Region—GEORGE W. TALLEY, Cutler Hammer Co., Milwaukee, Wisconsin

Vice President, Northeastern Region—E. LESLIE PRIESTMAN, Director of Industrial Engineering, Atlas Plywood Corp., Boston, Mass.

Vice President, Southeastern Region—MAURICE R. BACHLOTTE, E. I. du Pont de Nemours Co., Old Hickory, Tenn.

NATIONAL OFFICE STAFF

HAROLD R. BIXLER—Exec. Vice President

VINCENT A. FLYNN—Research Director

MARION CUSICK—Office Mgr. and Asst. Treas.

The editor will be pleased to review manuscripts submitted for publication, but will not be responsible for loss in transit, safe custody or otherwise.

DISCLAIMER: The views of the authors are not necessarily those of the Society for Advancement of Management. S.A.M. will not be responsible for any liability that might develop as a result of articles published in this magazine.

"Through research, discussion, publication, and other appropriate means to conduct and promote scientific study of the principles governing organized effort in industrial and economic life . . . for the general betterment of society . . ."
S.A.M. Constitution

CONTENTS

The Four R's Of Management 5
by John L. McCaffrey

Chapter Membership Standings 8

Tackling Old Problems With New Tools From Operations Research 9
by John M. Allderige

Man And Automation 13
by Walter H. Johnson

Substantive Decentralization In The Large Corporation 16
by Waino W. Suojanen

Use Of Sales Quotas By Manufacturers 23
by Donald R. Herzog

Nobody Cares How Tough You Had It 27
by Allen Hewitt

New Management Writing 30
Office Work and Automation by Harold S. Levin
Reviewed by Professor Lowell H. Hattery

ADVANCED MANAGEMENT, published monthly by the Society for the Advancement of Management, Inc., 74 Fifth Avenue, New York 11, N. Y., is successor to The Society for the Advancement of Management Journal, the Bulletin of the Taylor Society and of The Society of Industrial Engineers. Reentered as second-class matter, December 23, 1949, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Copyright, 1956, Society for Advancement of Management. Permission must be obtained for reprinting, digesting, or quotation. Subscription rates: $8.00 per year. Single copies: 75 cents (members); $1.00 (non-members). All members receive this publication, for which $4.00 of their dues is allocated. Reprints of articles readily available in quantity, price schedule on request. An index to ADVANCED MANAGEMENT is published annually, and the contents are also indexed in Industrial Arts Index, available at Public Libraries. Notification of address changes must be given four weeks in advance.

MAKING DELEGATION EFFECTIVE

FORTUNE MAGAZINE, in an article published in March 1955 issue, entitled "The Subtleties of Delegation," pointed out that many managers today are just kidding themselves that they are doing an effective job of delegation. What is the reason for this conclusion? First of all, good delegation begins with an attitude of mind.

Mr. Lawrence A. Appley, President of the American Management Association, emphasized this very well when he said, "Unless there is some perfectly obvious reason why a person should not be given greater responsibility, we should give him the opportunity to prove he can carry it." In principle, this statement parallels the American system of justice—a man is innocent until he is proven guilty. Is there any reason why we should not apply this principle to all levels of management?

One of our leading American scientists, in response to the question "Are you trying to do the impossible?" replied, "The impossible is the thing we have not yet learned to do." In delegating we are not trying to accomplish the impossible. Instead, we are merely carrying out our managerial responsibility.

Unfortunately, there are misconceptions as to the real meaning of delegation. Some managers delegate and forget. Once they have assigned responsibility, they feel that they are relieved of all responsibility. Delegation is not abdication. Final responsibility and accountability for results still rests with the one who delegates. Other managers delegate on paper, but continually breathe down the backs of their subordinates, setting up controls, and requiring informal clearance on decisions, thus nulifying true delegation both in fact and in spirit.

Delegation is accomplished when we give people authority, both to make final decisions, and to require action by others. Without authority, we cannot hold people accountable for results—the real purpose of delegation.

Improving delegation requires action. Mr. Lester Zerfoss, S.A.M. Vice President for Seminar Operations, has given us five basic steps:

1. We must first have a clear understanding of the importance of delegation.
2. We must create a climate in which our people will want to put their best foot forward, do a bigger job, feel responsible, and be given honest recognition.
3. There must be mutual understanding between a man and his boss as to authority, responsibility, and accountability. Both must be on the same wave length.
4. We must challenge our people and test their skills, and we guide them in acquiring new knowledge.
5. We must use each new assignment to improve skills as a basis for further delegation.

To make delegation effective, we must first believe in it, identify the barriers that prevent it, and take positive steps to make it work.

JOHN B. JOYNT, *National President,*
Society for Advancement of Management

The modern industrial corporation is a very remarkable institution. It is the product of technological changes so great that it is probably true that more progress has been made in the last thirty years than in several centuries before that. And before we have fully understood or adjusted to the changes already made, we find ourselves facing an atomic age whose outlines are still dim and cloudy.

The Four R's Of Management

By John L. McCaffrey

President
International Harvester Company

WITH all the speeches, all the books, all the research work that has been and are being devoted to various aspects of management, I know I cannot add anything genuinely new to what has already been said. So I won't try.

Instead, I should like to try to reshuffle some of the facts you already know, perhaps to arrange them a little differently and give emphasis to particular points.

The growth of the corporation has been so rapid and so great that the problem of managing one is different not merely in degree but also in kind from the problem of forty years ago.

Henry Ford was not the inventor of the idea of mass production, but he was its first great practitioner. The success of that idea produced an acute problem in organization and management. The industrial organization became so large that it outgrew the abilities of one man or one small group of men to manage it efficiently. I think we must give Alfred Sloan much of the credit for solving that problem, as he developed the ideas of divisionalization and delegation of authority and applied them successfully to General Motors.

This article was given as an address by Mr. McCaffrey before the San Francisco Bay Chapter of the Society for Advancement of Management on February 9, 1956.

I have spent my entire working life —47 years up to now—with one company, and my company perfectly illustrates what has been going on. Back in 1909, when I joined it, International Harvester was considered a very large company, although it was really quite small and simple compared with Harvester today.

Primarily, we were then a farm implement company, with emphasis on harvesting machines, especially the binders and the mower. Just the year before we had introduced our first buggy-wheeled, kitten-powered motor truck, with the idea that the farmer could use it to get to market. We were in the early stages of development with tractors. We had not yet heard of the industrial power business, and neither had anyone else.

Almost a half-century later as I look around me I find Harvester, by most standards of measurement, one of the ten or twenty largest industrial corporations. Our sales exceed a billion dollars a year. Our capital is almost a billion. There are about 75,000 employes in the United States and thousands more elsewhere in the world. We have 7,000 dealers and about 40,000 suppliers. We do business in 142 foreign countries as well as at home.

One little statistic probably illustrates the change as much as anything can. In 1909 Harvester spent $474,000 for what we would now call research and engineering. Last year we spent for the same purpose something over $30,000,000. Even after we allow for the change in the value of the dollar that is still an increase of about 2,500 per cent.

Well, all this is just a way of saying that the modern large corporation is

JOHN L. McCAFFREY

Mr. McCaffrey began his long career with International Harvester Company as a warehouse clerk in the Cincinnati sales branch in 1909, at a salary of forty dollars a month. He became a motor truck salesman, then assistant manager of that branch. In 1923 he was appointed assistant sales manager of the Central District, became district manager two years later. In 1930 he was appointed assistant manager of domestic sales, became domestic sales manager three years later. In 1937 he was made director of domestic and Canadian sales. He was elected vice president in 1940, became second vice president and a director of the company in 1941. Mr. McCaffrey became president of the Harvester Company in 1946.

an effective and enormously powerful economic instrument. It has great resources; it has many talents and many skills. It directly affects the lives of thousands—in some cases, millions—of the people.

And because it is all these things and has these effects, our whole concept of corporate management has undergone a change. This change was greatly accelerated by our experiences during the depressed 1930s when business and businessmen found themselves under bitter attack from many sources. But the change would have come anyway. It was a natural and inevitable development.

THIS change I am talking about is the tremendous enlargement and sharpening of the sense of management responsibility. It is an extension of that feeling of responsibility to new groups. It is a deliberate attempt to weigh the equities of the situation and act accordingly.

This has given rise to what I call the Four R's of management, and each of these R's stands for Responsibility.

We have, of course, as we have always had, a responsibility to ownership. This is the first R. The people who provided the capital which made our businesses possible have, legally and morally, a first claim on our attention.

But ownership has been changing greatly. In the beginning all businesses were family or individually owned. Then corporations with relatively small groups of stockholders came into being. Stockholder numbers have enlarged and family holdings have been distributed—most dramatically in the recent Ford case but gradually and steadily over the years in many other cases. My own company now has about 105,000 share owners. Only ten years ago their number was less than 40,000.

Moreover, the lines have blurred. There is no great distinction to be made nowadays of an ownership class. Thousands of these share owners are also employes. Thousands more are also customers, for one or another product.

The great change, however, is in our attitude. We still recognize our stewardship for our owners. The safeguarding and enhancement of their capital is our first duty. But we no longer think of the ownership group as the *only* group with a genuine claim on the corporation.

Moving prominently into the picture, especially in the past twenty-five years, has been the second R—the responsibility we have to our employes.

This has been felt for many years, and manifested in many ways. Government, at both the state and national levels, has entered into this field. The growth of the labor unions has had a great influence. Yet I am bold enough to say that the influence of government and the influence of the unions have been largely in accelerating a trend, rather than in initiating it.

From the beginning of what may be considered modern times, management has felt and acted upon its responsibility to employes. I will offer proof.

In 1908, before there were any state laws to provide workmen's compensation for industrial accidents, my company introduced a compensation plan. As a matter of fact, some of the early state laws were patterned after that plan.

At that same time—a quarter of a century before social security, a generation ahead of widespread unionization—we installed a pension plan. A sickness benefit plan dates from about the same time. And Harvester was by no means alone in these activities. Numerous other companies were pioneering with us in those fields.

In 1955 we all heard much about supplemental unemployment benefits—usually misnamed the guaranteed annual wage. The idea of supplemental unemployment benefits has horrified some people, but it does not horrify me. One reason is that, back in the '30s, we made a stab at the same problem ourselves. We introduced a plan to provide money to employes to meet two needs: first, if they were laid off, and second, when they retired. It was financed, incidentally, not by a nickel an hour but by a very liberal profit-sharing formula.

WHAT happened to it? After four or five years, it was bargained out of existence by the unions with which we then had collective bargaining relationships. They didn't like it.

In this whole area of our responsibility to employes, it seems to me that one of the most vital matters is giving information to employees—specific information about our business, its problems, its plans, its expectations, its results. We believe that if employes are as well-informed as we are—and if we are right in our decisions—employees are likely to come to the same conclusions that management comes to.

In these days we hear a good deal about "educating employees" or about "shaping employee attitudes." We are certainly interested in the attitudes of our people toward us. But our approach to this problem is not one of trying to manipulate employees' thoughts and attitudes by any clever devices. We respect their intelligence and their maturity too much for that. We don't think for a moment that they are foolable, or that they can or should all be herded into one pattern.

The Scripps-Howard newspapers for many years have had a slogan I always admired. It describes very well our approach to the whole problem of employee understanding and employee information. That slogan is: "Give light, and the people will find their own way."

We believe in that, and we consider the giving of light a part of our responsibility.

The third R, the third responsibility of modern management, is to our customers. This is the most familiar, I am sure, to all of us and it involves five primary things that the customer looks for in every product he buys. Those things are availability, performance, quality, price, and service.

THERE is no question that all businesses have done an outstanding job in making their products easily available. Distribution methods have probably improved as rapidly as any of the more technical arts. I think there is no question that performance also has been steadily improved and is today at very high levels and destined to go still higher, not only in doing better the jobs that are already performed but also in doing jobs which are not yet performed by industrial products.

Quality and price are related, and a balance must be struck between them which will vary from one business to another. In my own business, the manufacture of relatively expensive, durable machines which are used in other people's production, we are intensely concerned with quality at all times. In my capacity as a customer for other kinds of goods, I have sometimes wondered if quality is getting all the attention it deserves.

Price, of course, is a sensitive subject with all of us, whether it is the price of a machine, of money, or of a service we render. The price mechanism is the governor or our whole economic system, and nothing concerns us more.

It was the theory of the classical

economists that prices were always set to attain the maximum possible immediate profit. This is certainly not true of the modern corporation. It is so untrue that I am sure many of you will remember when my company and a number of other large companies attempted, after the war, to check the upward spiral of prices by a deliberate program of price reduction, even though our products were in short supply and we could have raised prices without any real customer resistance. As it turned out, our attempt failed. The point is: the attempt was made, made by business managements of their own volition. Adam Smith would never have believed it, but it was so.

As an indication of how keenly management feels its price responsibility, let me tell you this one fact: since 1941, before World War II, the price of farm equipment has gone up less than the price of farm products. This is true despite the fact that for several years we could not fill the demand. It is true in spite of the highly-publicized decline in farm product prices since 1953. The farmer's prices are still ahead of our prices, even in today's markets.

Finally, I come to the fourth R that I want to talk about. This is the newest one, the one of which management has most recently become conscious. This fourth R is our responsibility to the communities in which we live and do business.

Interest in what is called "Community Relations" has grown rapidly in the last five or ten years. In part, that has been due to the fact that so many companies have put new plants or new stores in communities where they never were before, sometimes where no industrial establishment had been before. In part, it has come because community institutions had problems which could not be solved unless industry helped to solve them. And in part it has come because of industry's concern for better understanding of our business system by the general public.

Our company does business in something over 300 communities in the United States. As we have tried to clarify in our own minds the responsibilities we have toward these 300-odd towns and cities, we decided they were four in number.

First, we have to earn a profit. If we don't do that we will not be in business very long. And however noble its aims or its declarations may be, a dead or dying business is no asset to any community. So our first duty is to earn a profit and stay in business, provide jobs, pay our payrolls, and otherwise be a healthy, living part of the community.

Second, we have a responsibility to grow, if possible, so that we can provide better jobs and bigger payrolls and help the community to grow also. To do that, we must be a competitive company in every sense of the word. We must be active and aggressive in research and engineering. We must keep looking ahead and moving ahead.

Third, we think we have an obligation to keep the community informed of our actions and our plans. Since what we do may have an effect on other businesses, on the city government, on the schools, on the churches, and many other groups, they have a right to know what is going on, and we have an obligation to tell them. We hope the news will always be good but, since we are a human and fallible organization, we know it won't. Nevertheless, good or bad, we believe we must be honest and straightforward about our actions and our policies.

Fourth, when we live in a community we have an obligation to be a real part of that community, not merely in its industrial life but in the other phases of its life as well.

That means more than just obeying the law and paying our taxes. We cannot expect the community to be interested in us and our problems unless we are interested in it and its problems. We must be prepared to contribute in money, manpower, ideas, and energy to worth-while community activities which are of direct or indirect benefit to us and to our employes in that town.

Our people get sick, too, so we care about the hospitals. Harvester people have children, so we care about the parks and the schools. Our money and our men must do their part. We not only have a duty, for example, to contribute to certain welfare drives; we also have a duty to ring our share of the doorbells.

We have a general theory on the subject of industry and its relationships with the public. We agree that industry would like to be well-thought-of. We agree that better public understanding of business is desirable. We don't especially quarrel with people who want to advertise, or use a lot of air time, to promote those objectives.

But we have the belief that there has been far too much of an abstraction called Industry trying to communicate with another abstraction called the Public, when the truth is that there is no such entity as Industry, except in government statistics, and there is no such entity as the Public, any more than there is such a creature as the Average Man.

The truth is that there are thousands of individual companies which do not all think or behave alike. There are millions of individuals in thousands of communities, who also do not all think or behave alike. The problem is to get them together.

So we try, whenever we can, for face-to-face communication, for personal contact with people. Yes, we use mass

S.A.M. Rating of Time Study Films

EIGHT REELS depicting 24 typical manufacturing and clerical operations alternately shown in five separate scenes. Composite time-values, based on the judgment of 1200 experienced time study men, afford comparison with the national average.

NOW IN USE THROUGHOUT MOST OF THE FREE WORLD

as

- THE CLASSICAL REFERENCE IN TRAINING AND REFRESHING TIME STUDY MEN
- AN OBJECTIVE GROUND FOR SETTLING STANDARDS DISPUTES
- A SWIFT, ECONOMICAL MEANS OF ACHIEVING RATING CONSISTENCY TOWARD A FAIR DAY'S WORK.

Inquire:

Research Division
SOCIETY FOR ADVANCEMENT OF MANAGEMENT
74 FIFTH AVE., NEW YORK 11, N. Y.

communications, too. But we really believe in the personal approach, in letting the other fellow see us, observe our actions, examine our policies, and reach his own conclusions.

It is true that we can't hope to reach as many people that way, in a given space of time. But we think we make a more lasting impression on the ones we do reach.

For example, we have what we call our forum luncheons. We go to one of our plants or other communities and invite a group of people to lunch. As nearly as we can make it so, the guest list is a cross section of that community, representing all groups, all interests.

I go with one or two of our other officers from Chicago. Our local manager is the host. We don't show any movies, or hang up any placards, and the only speech lasts about five minutes. It is a recital of the four points I gave you a moment ago—the things we believe constitute our obligations to a town where we do business.

CHAPTER MEMBERSHIP STANDINGS

as of July 1st, 1956

New York	406	North Alabama	75
Philadelphia	378	Georgia	72
Northern N. J.	348	Columbus	71
Cincinnati	306	Knoxville	69
Lancaster	279	Richmond	69
Chicago	276	Reading	65
Cleveland	270	Clearing	63
Pittsburgh	243	Trenton-Del. Val.	63
Detroit	198	Alabama	62
Washington	197	Greenville	58
Boston	190	Hartford	55
San Francisco	171	Central Pa.	54
Milwaukee	158	Calumet	52
Los Angeles	145	Western Mass.	50
Dallas	144	Twin City	47
Indianapolis	121	Fox Valley	44
Worcester	120	Central N. Y.	43
Hudson Valley	119	Charlotte	42
Montreal	119	Lehigh Valley	40
Western N. C.	118	Madison	40
Raritan Valley	109	North Miss.	37
Long Island	106	St. Louis	37
Baltimore	101	New Orleans	34
Sacramento	101	London, Ontario	33
Binghamton	99	Nashville	33
New Haven	98	Athens	32
Greensboro	95	Northeastern Pa.	32
Kansas City	90	Portland	26
Puerto Rico	82	Louisville	15
Wilmington	81	Stamford	12
Bridgeport	79	Non-Chapter	97
Providence	79	Non-Resident	86
Dayton	77		

Then we tell them our purpose is not to lecture but to answer. We want to know what they think. We want to answer their questions about us, good or bad, favorable or critical. We tell them that nothing they can ask will embarrass us because we already know that we're not perfect.

These sessions often begin slowly. Usually they last from an hour to two hours, after the questions start. We have never planted a question nor have we ever ducked one, including the time in Milwaukee that a lady stockholder opened the ball by saying to me:

"Why is your pension so big? I think it ought to be cut."

Perhaps I ought to add that these meetings, and every question asked, are fully on the record. Newspaper reporters are always present.

I am sure that at the beginning of one of these sessions our guests suspect that it is a gimmick of some sort. I believe also that by the end they accept the fact that we are sincere, that we really want to know what they think is good or bad about us, and take action accordingly. These meetings, we think, are one way of meeting our obligation to keep people informed.

I told you we were interested in schools, and we are. I don't believe any Business-Industry-Education Day has ever taken place in a town where we have a major operation without Harvester participation. That's just natural because we, like you, welcome visitors and a chance to tell our story.

But there is a point here. In one midwestern city where we have a large plant, there was a B-I-E Day. The businessmen were very happy at the chance to show and explain their plants, stores, and offices to the teachers. They thought they had made a real impression, and they had. So much so that the teachers and school principals wanted to return the courtesy and show *their* work and their successes and problems to the businessmen.

THEY set a day and issued the invitation, and I am ashamed to tell you that only about 10 percent of the business people showed up. Let me repeat: we cannot expect people to be interested in us and our problems unless we are genuinely interested in them and their problems.

Doing our share in a community involves spending some money. For example, nearly all communities today face shortages of hospital beds. One of the requests we get most frequently is for contributions to new or enlarged hospital facilities. I checked recently, and in the past three years we have given about $644,000 for hospitals alone.

Another subject which has attracted a great deal of business attention in the last year or two is the financial plight of the private colleges and universities. The colleges themselves developed a very intelligent approach to this problem by forming into state or regional associations and conducting joint fund-raising campaigns. Thus, a businessman can give once to a common fund and is not faced with the difficult task of trying to make allocations among many worthy institutions.

SUCH an association of colleges has already been formed in southern California, and I am told that another is under discussion here in northern California.

Now and then each of us does something that he likes to remember. And one of the things that I look back on with some pride is that I had the honor of being a speaker six years ago, at Evansville, Indiana, on March 23, 1950, when the first such plan in the United States was launched by the Indiana colleges. From Indiana, the plan has spread across the country. Last year our Company contributed to eleven of the state associations, and this year we will broaden our list as more and more of the new associations meet the standards we have set.

I said at the outset that I could bring you nothing new in management techniques, nothing new in research, nor in theory. I believe those things will come by themselves if we will keep our eyes steadily fixed on these responsibilities which I have called the Four R's of management.

We must set our policies and make our day-to-day plans in such a way that we achieve a fair and reasonable balance among the interests of our share owners, our employes, our cutomers, and our communities.

The first three of these are obligations that we have long recognized. The fourth is winning recognition but is still in the development stage. For that reason—and until we are sure that we are doing an equally good job in this area—I suggest to you that each of us should ask himself at frequent intervals:

"What have *I* done for this community lately?" ■

The term "operations research" is something of a fight word in management circles these days. This is regrettable since it obscures the fact that some very good research has gone on in management science and some very good tools have been developed for tackling management problems. These tools are logical implements for industrial and management engineers. In putting them to work, these engineers are making a perfectly natural extension of their constantly maturing function; it is right in line with their professional growth.

Tackling Old Problems With New Tools From Operations Research

By John M. Allderige
Technical Advisor
Industrial Engineering Division
Kodak Park Works
Eastman Kodak Company

THE disenchantment about operations research has arisen from both the customary high-level approach and the emphasis on fairly complex techniques. The former worries many management people since it leaves the impression that they are, if not obsolete, obsolescing rather rapidly. The latter is frankly unrealistic. A new and powerful technique may prove to be the clincher on a particular problem, but it can hardly work in a vacuum; it must work in conjunction with existing managerial skills and techniques.

Let's consider some management problems and see how industrial engineers can use the fruits of this research into operational areas. These problems are not necessarily high-level, company-wide problems; they are at the level encountered daily by practicing industrial engineers. So this discussion, at worst, should leave management sullen and, for once, perhaps, not mutinous about operations research.

*Service Labor and Queueing Theory** —Controlling service labor is a problem in every company. This is labor that is on a demand basis—labor of an indirect or non-repetitive type whose services are constantly on *call* but only intermittently, randomly used. Machine-breakdown repairmen are in this category and are increasingly important as automation (another "fight" word) moves into the picture. Oddly enough, this control problem has become more prominent as the use of work sampling has increased. For work sampling has effectively disclosed, time and again, the fact that a service crew is inactive part of the time. But this information is not enough. Arbitrary crew reduction merely creates machine delays on those occasions when several machines demand service at once, possibly as costly as idle labor.

The idle labor can be considered as labor "queueing up" or waiting in line to service machines. Machine delays can also be considered as machines "queueing up" to be serviced. This queueing problem can be resolved by the use of queueing theory—a segment of probability theory—which permits the engineer to predict the effect of various crew sizes on the idle labor and machine wait time characteristics. The procedure is straightforward—usable by all industrial engineers.

Here is a simple example that takes about as long to explain as it did to do. At our Kodak Park Works, the Kodacolor Printing Room, at a particular production level, had a crew of 3 handlers per shift supplying and inspecting magazines of photographic paper for 28 printers. Since these magazines had paper of varying length and the printers had varying speeds, the demand pattern for supplying magazines was quite unsystematic. Nobody knew just when a printer, or, indeed, several might be in need of a magazine change. The inspec-

This article is based on a presentation made before the S.A.M. Milwaukee Chapter's Fall Conference in October 1955 at Milwaukee.

**The writer is indebted to Messrs. R. H. Morris and C. H. Remilen of the Scientific and Industrial Computing Laboratory, Kodak Park Works, and to Dr. S. Lee Crump, Statistician, Atomic Energy Project, University of Rochester. Mr. Morris and Dr. Crump were very helpful in advising on queueing theory application; Mr. Morris and Mr. Remilen handled the IBM calculation of the Machine-Serviceman table that appears in Figure 1.*

JOHN M. ALLDERIGE

Mr. Allderige has been with the Eastman Kodak Company since 1948. Upon graduation from Yale University with a B.S. in Industrial Administration he went to Columbia University for a M.S. in Industrial Engineering. He is a speaker of wide experience on statistical and mathematical applications to management problems, and the author of several articles on the subject.

tion of magazines was routine, however; they could be inspected at leisure and stored until needed. So the problem was one of controlling non-repetitive labor a *portion* of whose services were randomly demanded.

Work sampling results showed the 3 men busy 47% of the time(1).

The obvious move to reduce the crew to 2 men and experience about 71% activity (47% x 3/2) was not automatically the right move owing to the

MACHINE-SERVICEMAN TABLE

a	m \ r	5 f	5 i	10 f	10 i	15 f	15 i	20 f	20 i	30 f	30 i	40 f	40 i
.025	1	.8784	.0026	.7577	.0065	.6384	.0117	.5213	.0187	.2993	.0424	.1161	.0941
	2	.9390	.0000	.8780	.0005	.8172	.0007	.7564	.0013	.6353	.0033	.5154	.0065
	3	.9593	.0000	.9187	.0000	.8781	.0000	.8374	.0001	.7562	.0003	.6751	.0009
	4	.9695	.0000	.9390	.0000	.9085	.0000	.8780	.0000	.8171	.0000	.7568	.0001
	6	.9797	.0000	.9593	.0000	.9390	.0000	.9187	.0000	.8780	.0000	.8374	.0000
	8	.9848	.0000	.9695	.0000	.9543	.0000	.9390	.0000	.9085	.0000	.8780	.0000
.05	1	.7644	.0103	.5380	.0297	.3300	.0620	.1589	.1168	.0085	.3059	.0000	.4750
	2	.8810	.0003	.7624	.0020	.6447	.0052	.5288	.0105	.3080	.0312	.1233	.0795
	3	.9206	.0000	.8413	.0001	.7620	.0005	.6830	.0014	.5262	.0050	.3732	.0013
	4	.9405	.0000	.8810	.0000	.8214	.0000	.7619	.0002	.6432	.0009	.5251	.0027
	6	.9603	.0000	.9206	.0000	.8810	.0000	.8413	.0000	.7619	.0000	.6826	.0001
	8	.9702	.0000	.9405	.0000	.9107	.0000	.8810	.0000	.8214	.0000	.7619	.0000
.10	1	.5640	.0407	.2146	.1360	.0365	.2934	.0019	.4510	.0000	.6333	.0000	.7250
	2	.7732	.0023	.5519	.0143	.3458	.0405	.1726	.0899	.0106	.2745	.0000	.4500
	3	.8485	.0001	.6975	.0016	.5484	.0065	.4092	.0169	.1536	.0689	.0204	.1919
	4	.8864	.0000	.7728	.0002	.6594	.0010	.5470	.0034	.3299	.0172	.1423	.0565
	6	.9242	.0000	.8485	.0000	.7727	.0000	.6970	.0001	.5460	.0011	.3970	.0051
	8	.9432	.0000	.8864	.0000	.8295	.0000	.7727	.0000	.6591	.0000	.5457	.0004
.15	1	.4045	.0869	.0659	.2838	.0022	.4900	.0000	.6167	.0000	.7444	.0000	.8083
	2	.6751	.0066	.3758	.0429	.1433	.1243	.0274	.2543	.0000	.4889	.0000	.6167
	3	.7827	.0004	.5681	.0065	.3648	.0260	.1897	.0682	.0138	.2439	.0001	.4250
	4	.8370	.0000	.6742	.0009	.5135	.0054	.3592	.0174	.1069	.0871	.0076	.2391
	6	.8913	.0000	.7826	.0000	.6740	.0002	.5656	.0010	.3537	.0090	.1643	.0390
	8	.9185	.0000	.8370	.0000	.7554	.0000	.6739	.0000	.5113	.0008	.3513	.0053
.20	1	.2849	.1418	.0184	.4110	.0002	.6001	.0000	.7000	.0000	.8000	.0000	.8500
	2	.5891	.0138	.2404	.0884	.0465	.2372	.0028	.4017	.0000	.6000	.0000	.7000
	3	.7225	.0010	.4536	.0165	.2205	.0646	.0665	.1599	.0005	.4003	.0000	.5500
	4	.7917	.0000	.5845	.0027	.3851	.0161	.2088	.0506	.0181	.2144	.0001	.4001
	6	.8611	.0000	.7222	.0000	.5836	.0007	.4468	.0042	.1956	.0347	.0363	.1327
	8	.8958	.0000	.7917	.0000	.6875	.0000	.5834	.0002	.3777	.0044	.1882	.0258

m = NUMBER OF MACHINES

r = NUMBER OF SERVICEMEN

$a = \frac{l}{u}$ = AVERAGE SERVICING TIME / AVERAGE RUN TIME

i = AVERAGE MACHINE WAIT TIME

f = AVERAGE SERVICEMAN WAIT TIME

} EXPRESSED AS A DECIMAL FRACTION

REF.: FELLER, W. PROBABILITY THEORY AND ITS APPLICATIONS JOHN WILEY & SONS, NEW YORK, 1950, PP. 380–382

EXAMPLE:

$m = 20$

$r = 2$

$l = 3$ MIN. $\}$ $a = .05$

$u = 60$ MIN $\}$

$i = .0105$ OR 1.05% MACHINE WAIT TIME

$f = .5288$ OR 52.88% SERVICEMAN WAIT TIME

COMPUTED UNDER THE DIRECTION OF MR. ROBERT H. MORRIS BY MR. CHARLES H. REMILEN BOTH OF THE SCIENTIFIC AND INDUSTRIAL COMPUTING LABORATORY, TIME AND PAYROLL DEPT., KODAK PARK WORKS.

FIGURE 1

demand nature of their work. Queueing theory had to be employed to evaluate the effect of such a possible move.

The Application of Queueing Theory

The engineer procured the following basic information about the operation:

1. $m = 28$ = number of printers under consideration
2. $r = 2$ = number of servicemen under consideration
3. $a = \frac{l}{u} = .0246$

Where $l = 3.1$ minutes = the average time for a handler to supply a magazine to a printer

$u = 125.8$ minutes the average run time of a printer

The average magazine change time (l) was obtained from regular stop watch studies. The average printer run time (u) was obtained from printer logs where the paper footage for each run was recorded. Knowing printer speed, time for each run and the average run-time were simple to compute.

With this basic information, the engineer used the Machine-Serviceman table (Figure 1) (2) which is based on queueing theory. He entered the table at the closest point (3):

$m = 30$ $r = 2$ $a = .025$

and read the values:

$i = .0033$ or about .3%
the average fraction wait time per printer

$f = .6353$ or about 63.5%
the average fraction wait time per handler.

Thus he could say that if the crew were reduced to 2 men, the delay introduced by such a reduction (delay due to interference) would be about .3%. The handler idle time, of course, would be much less than 63.5% in actuality owing to the inspection portion of the job; the work sampling 2-man crew estimate of 71% busy, or 29% idle, would still hold. Queueing theory only considered the random demand portion of the operation.

So it looked as though a 2-man crew was all right but a final check on the applicability of queueing theory had to be made. Certain conditions in real life must be met before the table based on this theory can be used for prediction purposes. It must be established that there is no systematic demand for services — that the demand is truly random. The easiest and most effective way to do this is to match the table values for the *existing* situation against *actual measured* values. In this case, for a 3-man crew, the engineer read off the following values (at $m = 30$):

$i = .0003$ or about .03%
$f = .7562$ or about 75.6%

During the work sampling study of the 3 man crew printer downtime due to waiting (i) was studied as well as the handlers' busy time changing magazines. There were no (zero) instances of printer wait time which corresponded to .03% for all practical purposes. Magazine changing time from sampling came out to be 27% (± 5%) which gave an (f) value of 73%, (100% –27%), again matching the table value adequately. These match-ups verified the assumptions necessary for the theory that a completely random situation prevailed. The prediction of .3% printer delay for a crew of 2 was valid and, since it was negligible, the 2-man crew was adopted on an incentive pay basis. Results were as predicted.

It should be noted that there are other machine interference situations — some with dissimilar machines, some partially random, some completely systematic. Other mathematical models covering these situations have been developed to handle these. (4) The engineer may get a clue as to which model to use from an engineering description of his situation. The final proof, however, is *whether or not the model fits the observed data.* If it does, as above, then any prediction is valid; if it doesn't, another model must be sought.

Such is the simplicity with which queueing theory can be used. The hardest part of its application is the procuring of the basic information but sampling procedures make that a routine industrial engineering measurement process. Using the table avoids some extremely cumbersome calculations that are associated with queueing theory and puts the theory within the grasp of every practicing engineer.

A theoretical model like this, moreover, puts the industrial engineer in the objective position of offering *alternatives* and *not* a recommended *solution.* In this example, it really was a case of deciding whether the .03% to .3% wait time change (affecting processing service) was worth the cost reduction of a 3- to 2-man crew change. The engineer established the *basis* for decision with a good prediction technique and supervision *made* the decision. This was management by choice, not by chance.

In the example, then, work sampling and queueing theory were on a team that accomplished this:

Before
3-man crew
9 men in all

After
2-man crew
6 men in all
$10,000 prevented excess cost

There were a lot of *other* techniques on that team—addition, subtraction, good manners, stop watch measurement, and so forth. Particular attention was paid, of course, to the vital human relations problem associated with the crew alteration. Installation of the incentive standard was held up until an increase in production permitted the existing 3-man crew to act as the incentive crew. Such consideration of the human aspect is vital to the workability of any plan like this and its future counterparts. The thoughtful timing of the crew changes maintained and strengthened the harmonious, cooperative atmosphere without which all the mathematics in the world is completely ineffectual. The team of regular industrial engineering techniques and a sympathetically human approach set the stage for queueing theory. When *added* to the team, queueing theory proved to be the clincher in handling the total problem of service labor in the printing room.

There is another human aspect to such an installation as this that emphasizes the industrial engineering role. The decision on crew size had previously been made by supervision, now it was being done, as one foreman put it, "by the numbers." This, if you will, is managerial automation and the spectre of managerial technological unemployment, in the form of reduced prerogative, looms large in many minds. Actually, it *releases* managerial skills in judgment to tackle the endless human problems that often get shunted aside in favor of these operational ones.

Industrial engineers are well experienced in introducing this type of managerial aid; they have been running a similar gauntlet for fifty years. There is a delicate social structure that is tampered with as mathematical and statistical techniques move in on management decision-making at *any* level. Many hours of discussion must be spent to have supervisors and managers realize that problems requiring artistic skill really begin—not end—as this movement continues. Management engineers have been so operating for quite a

while; their counselling position makes them logical instruments for getting maximum reward from results of operations research.

THE above example pointed up the two basic aspects of any investigation in any of the sciences; measurement and the use of a model. In industrial engineering, we have the notion of measurement rather well established—statistical twists can give us more control over and extend our measurement into new areas. The use of models, however, is by and large confined to pictures, diagrams, and physical models rather than abstract models of the mathematical sort. Yet, in proportion as we use more abstraction we gain more insight as to the nature of our problems and thereby stand a greater chance of solving them—which is, after all, our thoroughly practical end point. Witness the effectiveness of queueing theory in this example by offering an abstract mathematical model (in easy-to-take table form) of the real life situation. With that model, it was possible to predict on *paper* the effect of some contemplated action which, without the ability to predict, might, indeed, not have ever been contemplated.

The development of this queueing model was operations research in its purest form. It required identification of an operational problem type and the awareness of certain mathematics adaptable to a general solution. It was no one-shot affair; a basic truth on waiting line behavior was captured. There are other models that have been developed applying equally well to other industrial problems. Having looked at queueing in some engineering detail, let's consider a few of these others somewhat briefly for flavor. It isn't the intent to show solution techniques but rather to show problem types. The industrial engineer's next step is to review more detailed literature and corner a mathematician and/or statistician for guidance in carrying out solution procedures. Most problems covered here have had the mathematical development work and solution rituals worked out.

These examples give some idea of how effectively industrial and management engineers can put research thinking to work for themselves. There are many other traditional problems that have been studied intensively in operations research—inventory control, overall production control, assembly line balancing, predetermined time data, communications, organizational structure, and motivation and morale. Not all of these researches are ready for engineering application but industrial engineers would do well to keep abreast of the thinking for there is a steady outpouring of usable techniques often disregarded for lack of effective interpretation at the applied level.

Mentioned throughout has been the consulting role of mathematicians and statisticians. As industrial engineers progress, assistance from and consultation with these professions is necessary. We have much to learn and must constantly be learning about possible solutions to many management problems.

OPERATIONS research can be considered as research into phenomena that *cannot* be cornered in a laboratory, that are going on continuously such as industrial processes. In this new activity, industrial engineers have their long-needed, formal research arm. They have only to reach out a little to grasp the already effective tools offered by this research; they have only to take the next logical step in their professional development to put these tools to work. As they do this—no matter what the level—they will be moving toward their goal of bringing more science to management. ■

Reference Notes

(1) *Gustat, G. H., "The Use of Engineering Statistics in Work Measurement,"* Transactions of the SAM-ASME Time Study and Methods Conference, *New York, April* 28, 1955.

(2) *This table is based on formulations given by:*
Feller, W., Probability Theory and Its Applications, *John Wiley & Sons, New York*, 1950, *pp.* 380-38. *Computational Procedure:*

$$\frac{P_n}{P_o} = \frac{m^n}{n!\,(m-n)!} \quad r>n>0 \qquad P_n = P_o \frac{P_n}{P_o}$$

$$\frac{P_n}{P_o} = \frac{m^n}{r!\,r^{n-r}\,(m-n)!} \quad r<n \qquad i = \frac{\sum_{n=n+1}^{m} (n-r)\,P_n}{m} \quad r=n$$

$$P_o = \frac{1}{\sum_{n=0}^{m} \frac{P_n}{P_o}} \qquad f = \frac{\sum_{n=0}^{n} (r-n)\,P_n}{r} \quad n<r$$

P_n, P_o, m, n a, r, f, are defined in figure 1

(3) *Interpolation didn't make sufficient practical difference here. When necessary, linear interpolation is usually sufficient or computation can be carried out as shown in note* (2).

(4) *Fetter, R. N., "The Assignment of Operators to Service Automatic Machines"*, Journal of Industrial Engineering, *Sept.-Oct.* 1955.
Jones, W. Dale, "Simplified Incentives for Multiple Production," Advanced Management, *June*, 1950.
MIT Summer Course in Operations Research, *Technology Press, Massachusetts Institute of Technology, Cambridge, Mass.*, 1953.
Sandberg, K. O. W., "A Research Report on Interference Delays in Multiple Machine Assignments," Transactions of the SAM Time Study and Methods Conference, *New York, April* 1953.

(5) *Charnes, A., Cooper, W. W., and Henderson, A.*, An Introduction to Linear Programming, *John Wiley and Sons, New York*, 1953.
Henderson, A., Schlaifer, R., "Mathematical Programming," Harvard Business Review, *May-June*, 1954.
Saline, L. E., "Quadratic Programming of Interdependent Activities for Optimum Performance," Paper 54-*A*-58, *The American Society of Mechanical Engineers, presented at the ASME Annual Meeting, November* 28, 1954.
Salveson, M. E., "Mathematical Methods in Management Programming," Journal of Industrial Engineering, *March, Sept.*, 1954.

(6) *Allderige, J. M., "Statistical Procedures in Stop Watch Work Measurement," publication forthcoming, paper available on request.*
"Work Sampling Without Formulas," Factory Management and Maintenance, *March*, 1954.
Churchman, C. W., "Some Methods of Operations Research," Proceedings of the First Seminar in Operations Research, *Case Institute of Technology, Nov.* 8-10, 1951.
Deming, W. E., Some Theory of Sampling, *John Wiley and Sons, New York*, 1950.
Dixon, W. J., and Massey, F. J., Introduction to Statistical Analysis, *McGraw-Hill, New York*, 1951.
Malcolm, D. G., Sammett, L. L., "Work Sampling Studies: Guides to Analysis and Accuracy Criteria," The Journal of Industrial Engineering, *July*, 1954.

(7) *DeCarlo, C. R., "Use of Automatic and Semi-Automatic Processing Equipment in Production and Inventory Control,"* Proceedings of the Conference on Operations Research in Production and Inventory Control, *Case Institute of Technology, January* 20-22, 1954.
Perlis, S., Theory of Matrices, *Addison-Wesley Press, Inc., Cambridge, Mass.*, 1952.
Vazsanyi, A., "The Use of Mathematics in Production and Inventory Control," Management Science, *October*, 1954.

(8) *Feller, W., op cit.*
MIT, op. cit.
Blumen, I, Cornell University, "Comments on the Absentee Problem," unpublished memorandum to the writer, August, 1955.

(9) *This is a brief preview of a project undertaken by Mr. Roy Lomicka, Work Measurement Department, Industrial Engineering Division, Kodak Park Works. A published report on the entire project is planned for later in* 1956.

What is management's motivation in the matter of automation? Some call it pre-insurance. But this author, who has spent years in the field of development of the machines which are replacing some human workers, offers another answer to the question.

Man And Automation

By Walter H. Johnson

Manager, Customer Assistance Department
International Business Machines
New York, N. Y.

I AM with a supplier of automation equipment, and that certainly determines my point of view. We market both scientific computing and commercial data processing equipment, and it is my responsibility to prepare the customer for the installation of such equipment and to assist him in every way before and after it is installed. Thus, I can give you a close look at the relationships between the training and personnel problems, and the job of large scale automation of business procedures which our customers are accomplishing in their offices. Also, I have at least one suggestion for a research project which has considerable potential for the future and is within the scope of inquiry of a university.

Before I launch off into some of the problems, however, there is a question I might answer first. The question is: What do we mean when we refer to data processing equipment? This equipment which we talk of as bringing automation to the office is unique in three respects: One of them is that for the first time we maintain files on a continuous flow medium—a strip of magnetic tape contains the records instead of the unit-record punch card which has been the means of mechanization in the past. A considerable amount of information is condensed on a few inches of tape, and each reel of tape is several thousand feet long. Also, you can read and record on it very rapidly, at the rate of fifteen or twenty thousand characters per second.

The second thing that is significant is the large memory of the system. In general it will range from about ten thousand characters up to eighty or one hundred thousand characters. All of this information—stored and accessible either as words or as individual characters depending on the machine—is available to an arithmetic and logical unit.

The arithmetic and logical unit is the third significant item. It is able to do arithmetic at break-neck speed and to make decisions—for instance, it may choose the path of appropriate action on the basis of a high, low or equal comparison. The break-neck speed we are talking about, is illustrated by the transfer of characters from the memory to the arithmetic unit in a few millionths of a second, or performing additions at rates up to 20,000 per second.

So the distinguishing characteristics of this equipment are high-speed arithmetic, large memory, and very fast input and output on magnetic tape.

Since this is an automation conference, I'll first make one point on the subject of automation: As you know there are all kinds of automation equipment to help manufacturing people use tools better; office automation equipment makes it possible for us to use our heads a little better.

What preparations have to be made when people feel that they can get some benefit from automation in the office by installing data processing equipment? First, you have to select the area of the business that you wish to attack. This may be control of inventory or

WALTER H. JOHNSON

Mr. Johnson has been with IBM Corporation since 1946, and has served that organization in Applied Science Division, Electronic Equipment Product Planning Division and Programming Research Department before becoming Manager of the Customer Assistance Department. He spent two years as an engineer in Ballistics Research at Aberdeen Proving Grounds before going to IBM. He is a Member of Operations Research Society and the Association for Computing Machines.

A talk given by Mr. Johnson before a conference sponsored by The Society for Applied Anthropology, held at Yale University, December 27-28, 1955.

control of production. It might be a billing operation to get money into the bank sooner, or the control of costs in a chemical production operation, or something as simple as payroll. Having selected the area, and I shall discuss later why you might want to do any of these various jobs, you have to design the system. By system we mean the overall procedures and the sequence of operations which are intended to accomplish the job at hand. Designing such a system entails planning, much like the work done by an architect when he designs a house, a laboratory, or a university. After you have layed out the system, you have to spell out completely the specifications, as to size of records, techniques of internal control, etc., if you wish the job in the final analysis to suit your needs. Then these specifications must be translated into machine language. That is, they must be coded. And when you have prepared these sets of codes or sequences of coded instructions to the machine, which are called programs, you bring them to one of the testing centers run by an automation equipment supplier, such as ourselves. There, these programs are tested, prior to the equipment being shipped to your office.

ONCE the equipment arrives and the input data is in the form needed, and the final testing of the programs is complete, and all the details surrounding a data processing installation have settled into a regular pattern so that you are getting the results you want, when you want them, the system is ready to be operated on a daily scheduled basis. This process will generally take three months or longer from the time the equipment is delivered to your office and put into running order. Then for the first time the system begins to get into the hands of people other than those who might be classified as very skilled, professional personnel.

In order to accomplish this systems design, specification, coding, testing, and installation and finally getting the equipment into scheduled operation, you need qualified people. Now, I shall tell you something about the characteristics of these people. This is a general set of specifications. Our customer's installations average seventeen professional people. Some installations require over thirty and some are down to around seven, but the average requirement is about seventeen. These people are on the job for one and a half to two years before the machine arrives, so that in order to install this equipment properly and really have work ready for processing, twenty to thirty-five man years of preparation are needed. This is an aspect which almost everybody has failed to face realistically: it is a big job to get this equipment installed and working properly.

WHERE do these people come from? Fortunately, at least at this stage, most of these systems of data processing have gone to large corporations where there have been professional methods people, and the bulk of the seventeen have come from this methods area. Also included are people who, because of past punched card experience, are familiar with the problem of coding information in machine language and who know exactly how precise one must be in preparing all the input data. In view of their familiarity with the overall policies of record keeping of the company, some of the members of this data processing group are usually drawn from the accounting function. Also, it has proved to be worth while to have at least one or two technically qualified people, preferably mathematicians. Engineering personnel have worked out well too. The machines are best appreciated and understood by people who have had professional training at the university level.

Once the group is put together, six months to a year is usually required for what you might call the training phase, and this is not all schooling. For a month or six weeks the group attends manufacturer's schools to concentrate on programming and understanding the equipment, but a great deal of the training period following is spent becoming thoroughly familiar with the operating policies and procedures of their own company in the area of business in which the installation will operate, or, if they happen to be new employees, in generally learning about the company.

We have talked about people coming into this activity from the methods, tabulating, and accounting area of the business. Where do we get people from outside of a business? One of the things I have enjoyed most in my work in this area is bringing new people into the activity. I am constantly amazed at the varied backgrounds which seem to do very well. Originally, we had some difficulty in selection. To meet this problem we worked with MIT and the Educational Testing Institute of Princeton, and put together an aptitude test which we have been using very successfully now for about a year. Through the use of the aptitude test, plus a series of interviews, we have selected people more or less off the street. These are people who have been captured by the romance of automation and feel that the opportunities for personal development are too shallow in the area of activity in which they have previously engaged. A large number have had a technical background but we have also hired and trained professional musicians, artists, clerks, economics majors and argriculture majors, and these people have done outstanding jobs in this area. This serves to illustrate that in selecting people who will be successful, their aptitude for the new concepts in this area is much more important than what they are doing now.

THE lack of trained personnel in data processing is a challenge to the universities. Only a few college-trained programmers or professional methods men have been developed for work with these large-scale electronic systems. We can hire chemists, physicists, mathematicians, and electrical engineers, but almost no one gets a degree in the field in which we are primarily interested, and this is a big field. Although we are just manufacturers and vendors, we have trained and brought into the data processing business, in the last four or five years, about four hundred people. Our customers have hired and trained about three thousand in the last two or three years to prepare for the machines that we are building for them. This gives you an idea of the order of magnitude of the effort. Thus, we are developing within our society a new profession which has not really been sponsored by any group, but which is forming around the elite core of people who write programs and install electronic machines. It requires the disciplined mind of the mathematician plus an interest in business management problems. Some recognition should be given to this group of people beyond that which has been accorded so far. In particular, I hope that the universities graduate some people interested in the solution of business communication and information handling problems.

There is, of course, the problem of persons displaced by the growth of automation in the office, but before I talk about what happens to them I would

like to point out the four reasons why companies are interested in office automation. It costs a lot of money to install electronic equipment, in many instances a half-million to a million and a half dollars, so it is an important decision to make.

The reasons they are bringing electronics into the office are:

First, to do the same work with fewer clerks (it takes about ninety clerks replaced to pay for one of these machines). Second, to do more work with the same number of clerks. Third, to achieve more timely operations. Fourth, to achieve better control of operations.

In all of these cases we must add machine personnel to the activity, and there is always a conscious effort to bring people from the displaced ranks into the new operator or programmer area if they can qualify. If you introduce automation in your office for any but the first reason mentioned, you add programmers as well as adding capital for expansion of the business, and job opportunities are created.

There are two factors in the present American economy which makes a significant contribution towards alleviating the problem of displaced employees. First of all, industry is in a period of rapid expansion and this expansion is being accompanied by an increase in the ratio of clerical to productive workers. This is particularly true among the larger corporations where the greatest amount of automation activity is located. Secondly, an increasingly large percentage of the clerical force today is made up of young women whose average period of employment is quite short. In general these factors permit promotions, transfers, resignations and retirements to quickly eliminate any temporary surpluses which may occur.

The other thing that I would like to point out is that it is fortunate that automation came when it did. It has been particularly difficult for many organizations having large clerical staffs to keep these people any longer than is required for them to become partially trained. At this juncture they often sell themselves to another company for a little more money or a more satisfying job. I don't think that, with the advent of compulsory high school education and with better caliber people arriving in the clerical market, we can expect them to continue to just file papers and dockets in file drawers all day. This is not enough of an opportunity for the human being. Here again automation in the office is solving the problem rather than creating it.

I think a few statistics will lead up to my suggestion for research. It is my opinion, based on what I see, that there will be during the next decade about ten thousand of these stored program machines installed in American industry. Again, based on what I see today as the requirement for programmers, there will be a need for 170,000 people with professional status. This will include such machines as drum calculators which have large memories and tape, but not necessarily as much power from the arithmetic and decision-making viewpoints. It seems to me that we are just not going to have that many people. So, what we must do is learn how to control these machines with less effort, without as much time being consumed. This is an area in which the equipment manufacturers are working, an area we call "programming research." IBM has a large group working on this, and I know that our competitors do also. But this is an area that I think is uniquely well qualified for university work. It is a problem of establishing a uniform language for the definition of business problems which we can all agree to—a business algebra, if you will. This is the problem of providing a universal symbolism in which you can write specifications for the jobs. This must be followed by systems whereby these machines will automatically convert these specifications into specific machine language.

Finally, and this is again from the viewpoint of a supplier rather than user, I would like to offer one more comment: We have a large number of programmers working with us and operator personnel working with our equipment. The general trend relative to all these people has been to give them higher grades, more rewarding and productive jobs for which they get more pay. I don't know if this is generally true, but I haven't found any outstanding exceptions to it. What are the real management motivations? I have heard it called pre-insurance. I can assure you that's not the reason, as I see it. The basic facts are that office automation equipment is costly and huge capital investments are associated with its installation; thus larger incomes can be justified for those qualified to participate in its operation and to make it successful. ■

Training Mature Women For Employment

A UNITED STATES Department of Labor report on projects for the training of mature women for jobs in industry lists 23 training courses now being used by 12 projects visited by Labor Department representatives working on the survey.

The projects are:

Emily Griffith Opportunity School
Denver, Colorado ...6 courses

Department of Hospitals
New York City.....3 courses

Hannah Harrison School
Washington, D. C....3 courses

Department of Welfare
Chicago, Ill. .....3 courses

Joint Department of Welfare and Board of Education Project
New York City.....1 course

Public Aid Commission
E. St. Louis, Ill.....1 course

Hotel Training School
Washington, D. C.....1 course

Joint Restaurant Association and Board of Education Project
Washington, D. C.....1 course

Community Hand-sewing Project
Scranton, Pa. .....1 course

Community Power-sewing Project
Hazleton, Pa. .....1 course

Electronics Company 4-month Program
New York State.....1 course

Electronics Company 18-month Program
New York State.....1 course

Although this article is based on a segment of the author's research in the role of management in the large corporation, the conclusions drawn may be applied to all sizes and kinds of organizations. For even in the small business there is policy and administration, and there is the recurring problem of developing the theory of administration independently of the values of the organization. Some argue it can be done; others insist it can't. Mr. Suojanen's findings and conclusions on the subject make stimulating reading.

Substantive Decentralization In The Large Corporation

By Waino W. Suojanen

School of Business Administration
University of California
Berkeley, California

In the accepted theory of formal organization, a loose distinction is drawn between policy and administration. Policy refers to the determination of the goals and objectives of the organization while operation is used to distinguish the means used to attain these ends. Some, notably Simon, have argued that once the goals or values have been defined, a theory of administration can be developed on the factual level to indicate the most efficient methods of goal accomplishment.[1]

Others argue that a theory of administration cannot be developed independently of the values of the organization. In other words, the procedural plan of an enterprise must be specifically related to its substantive plan and if the latter is changed the former must be modified accordingly.[2] Substantive decentralization, which describes the organizational philosophy and structure of the well-managed large organization, belongs to this latter category of organization theories.

In the theory of rational hierarchy, the determination of the goals and objectives of the firm is the responsibility of a peak coordinator. The peak coordinator is typically a single individual. In order that he be able to coordinate the affairs of even a moderately large organization, he must delegate a large part of the procedural plan to subordinates. The substantive plan, however, or even elements of it, cannot be delegated because coordination depends upon a "unity of command".[3] While others may contribute to policy formation, in the last analysis one person must make the actual decision and this is a function that cannot be delegated.

The accepted theory of hierarchy is closely related to the economic theory of the firm. The entrepreneur in economic theory:

> *. . . is explicitly treated as a rational individual. The other participants—employees, customers, suppliers—enter into the theory only implicitly and only as passive "conditions" to which the entrepreneur adjusts in finding the solution that is optimal to him.*[4]

The usual theory of organization posits much the same relation between the peak coordinator and other participants except that the former may be an employee rather than an entrepreneur in the economic sense.

However, Simon also points out that:

> *Theories of organization, perhaps to a greater extent than the theory of the firm, have been concerned not only with optimal solutions, but with* viable *solutions—that is, solutions that permit the survival of organization (e.g., in the theory of the firm, outputs that yield a positive profit).*[5]

Before discussing substantive decentralization as a theory of viability, let us take a look at the three basic functions that must be performed if the going concern is to continue in business (survive). For the time being it need make no difference whether the element of coordination is provided by a single individual or by an executive group.

To begin, the firm must have a plan or plans; its behavior must be purposive. Secondly, the alternative or alternatives must be chosen which will permit the achievement of the plan or

WAINO W. SUOJANEN

Mr. Suojanen has combined business with teaching, having worked for Uarco Business Forms, National Automotive Fibres and Safeway Stores, Inc., while teaching at the University of Vermont and the University of California at Berkeley, where he is currently Assistant Professor of Business Administration. Mr. Suojanen received his B.S. degree from the University of Vermont. After Army service he received his M.B.A. from Harvard and a Ph. D. from the University of California.

plans. Finally, there must be a means of comparing the actual performance against the standards laid out in the plan or plans. In the absence of the latter there can never be any assurance of survival because corrective action will be instituted too late to modify the plan to changed circumstances. The essence of survival of any organization is the ability to adapt rapidly to any changes in the environment that may constitute a threat to its existence.

SURVIVAL AND INSTITUTIONALIZATION

If the organization is to survive and grow, the basic issue in policy decision becomes that of developing an identification between the participant and the enterprise. Survival implies that the firm has acquired values in and of itself, that it is no longer considered merely as a utilitarian instrument of production. The more the organization becomes impregnated with values, the less expendable it becomes. This is the process of institutionalization that Marshall had in mind when he wrote that:

> *Many corporate bodies of today, and especially colleges at Oxford and Cambridge, retain much of the spirit of old religious houses. The official Head, if a strong man, has great power; as has the Chairman or President of a great joint stock company; as a rule every member of the Governing Body cares for the future efficiency and prosperity of the deathless corporation with nearly the same zeal as if it were his own property.*[6]

Policy formation should not be confused with planning although a close relationship exists between the two. The former is much more general in nature because of its concern with the organization as a whole. If, as Simon points out, there are a number of viable solutions available to the policy makers of the enterprise, then a firm may survive and grow even if its policy is not developed to the point where maximum contributions are being obtained from all of its participants. This is an important factor to bear in mind when analyzing a particular organization; its mere survival, in other words, is no criterion that it is well-managed. In this respect, the market place furnishes a much sterner test of the efficiency of a commercial firm than is available in the case of a non-commercial organization.

In the organization in which policy is the responsibility of a single individual, as it is in the economic theory of the firm and in the theory of rational hierarchy, the values and beliefs of the vast majority of participants are disregarded. This makes it possible to identify the firm with the peak coordinator because there is either direct decision-making on his part with no delegation or, perhaps (but to a lesser degree) *ad hoc* delegation of decision-making with a final approval in practically every case by the peak coordinator. No organization goals exist apart from the (idealized) person of the leader.

Because policy is concerned with the survival of the organization and because survival is closely dependent on the contributions of participants, policy begins to have real meaning when it is closely linked to the values of the society. To put it another way, the policy of an organization is analogous to the culture of a society and makes a maximum contribution to the objective of survival when there is a close correspondence between the values of the society and the policy of the enterprise. The culture of the society is instrumental in molding the participants so that a "culture bound" policy becomes more predictive of survival simply because it is reinforced by the more general values of the society. For instance, in our own country, a "team" concept at the work level has meaning to the employee because, in his own background of growth and development, other kinds of "teams" have played a very important role. If it is granted that the leadership of the large organization is motivated less in terms of profit maximization and more in terms of survival and growth—if, in other words, authority arises out of the goals and objectives of the firm rather than descending from a peak coordinator, then policy formation must become a group endeavor. This in turn changes the nature of authority for no longer is the focus on an individual but rather on an institution.

WHERE the life of the organization is indeterminate, policy is of a long-range nature. Continuity of operations depends on a continuity of policy. For this reason, the determination of policy in the institutionalized organization must be the function of a group rather than of an individual. The existence of the institution is too valuable to jeopardize it by linking its values to the limited life span and the limited capacities of a single person. Continuity of policy requires not only the participation of a number of people but also *real* participation in order to provide for perpetual succession in the top leadership of the enterprise. Otherwise the death of the peak coordinator or his retirement may provoke a struggle for power initially and will certainly require a period of familiarization thereafter that may well threaten survival. Or else there occurs a change of government such as that characteristic of France where policy formation is quite often done on an *ad hoc* basis by the operating bureaucracy.

THE COMMAND TECHNIQUE OF CONTROL

Much of the literature of management is oriented in terms of a command concept of control. This is understandably so in view of its emphasis on an individual peak coordinator. As a result, any discussion of managerial prerogatives ultimately boils down to a definition of the "rights" of management vis-a-vis some other participant or participant group. Usually, the subject that stirs the most heat and least light is the delimitation of what constitutes the area of management decision as opposed to that of the union. In a strict sense such a debate cannot even be initiated unless the organization has achieved some degree of institutionalization, for in the strictly profit motivated firm only the entrepreneur plays an active (decision-making) role.

The exclusive use of the command technique of control is incompatible with the value system of the institutionalized organization. Command legitimizes authority through the sanction of fear. Because of this, command control does not and can not provide for emotional attachments to the firm except perhaps on the part of the commander. Fear generates insecurity rather than loyalty. As a result, even members of the managerial group will subsume the organization objectives to their own objectives in case of conflict. Thus instead of integrating the values and beliefs of the society into policy, command authority is alien to them and creates frictions and disappointments which often are aimed at eliminating the organization. The following expresses the above very clearly:

> *I suppose that every one of us is more or less in the habit of attributing them wholly to that part of reality which lies without his skin, and* emotional *attachment to the social order—i.e., the very thing capitalism*

is constitutionally unable to produce —is necessary in order to overcome the hostile impulse by which we react to them. If there is not emotional attachment, then that impulse has its way and grows into a permanent constituent of our psychic system.[7]

A command concept of control is necessarily identified with a limited span of control for power must be constantly asserted to make authority legitimate and to obtain a modicum of cooperation. The military analogy again offers proof of this point of view. Despite the fact that command is the basis of authority in the military and fear does play a role, the supreme sanction that the military leader strives for is that of identification of the individual with his "buddies," and his unit, and with his country.

The span of control of the military is definitely more limited than it is in civilian organization; it is necessarily shorter in the military in time of war than it is in peace because desire for self protection may negate authority, and it would be even more limited in time of war if command control were the only method of legitimizing authority. This becomes clear when the highly motivated and emotionally attached soldier is compared with the mercenary; the latter is nothing but the military prototype of the participant in the firm who is not accepted and recognized as a person but merely as another factor of production. Allegiance or the subordination of personal objectives in these cases does not attach to the substantive plan of the organization. The result of a centralized command theory of authority is a limit in the size, efficiency, and effectiveness of the organization based on the span of control of the person possessing supreme coordinating authority. But such a theory of management envisages a congeries of separate individuals to coordinated rather than an enduring institution based on continuing and constructive cooperation.

PERMISSIVE AUTHORITY

Permissive authority is closely related to the centralization of policy and the decentralization of operations. These three constitute the essence of substantive decentralization. No longer is authority exerted unilaterally downward. Instead of a command philosophy, permissive authority is based on reciprocity and manipulated field control.[8] Permissive authority differs from the charismatic and traditional classifications of authority which are related in principle and practice to the person of the leader. It also differs from the rational type of authority which presupposes a hierarchy ascending rigidly to one person as the supreme coordinator of the organization.[9]

PERMISSIVE authority is representative of an age in which the dictum *"of unquestioning obedience within the individual firm no longer holds."*[10] Schumpeter is indeed right in asserting that capitalist evolution has tended to erode the socio-psychological bases of the command concept of authority. However, the evidence indicates that it is being replaced by the new concept of permissive authority which is closely linked to the emergent philosophy and structure of the present-day corporation.

Permissive authority implies, at the policy level, decentralization of the kind expressed in the following:

But the government of discussion, if it can be borne, at once breaks down the yoke of fixed custom. The idea of the two is inconsistent. As far as it goes, the mere putting up of a subject to discussion, with the object of being guided by that discussion, is a clear admission that the subject is in no degree settled by established rule, and that men are free to choose in it. It is an admission too that there is no sacred authority—no one transcendent and divinely appointed man whom in that subject matter the community is bound to obey.[11]

Substantive decentralization operates through a diffusion of authority and a change in its character. No longer is the focus on either a person or impersonal leader but rather on an explicit recognition that authority resides in the organization qua organization. Once the executive group concept is admitted, discussion becomes a substitute for individual decision and action; as a result *". . . effective control of group attitudes is biased toward spontaneity and freedom rather than toward regulation and uniformity. In other words, it is permissive rather than restrictive"*.[12]

The difference between *delegation of authority* and *decentralization of authority* requires a definition of both in the light of the preceding discussion. In organization theory no clear distinction has ever been drawn between the two concepts, probably because of the influence of the presently accepted classifications of authority. In the charismatic, the traditional and the rational types of authority systems, the substantive plan is considered to be the responsibility of the chief executive. Therefore it is a function that cannot be decentralized because it involves the objectives of the organization.

Delegation, on the other hand, refers only to the elements of the procedural plan, no matter what the type of authority. Only the factual aspects of administration can be delegated; the valuational aspects of management, because they concern the organizational objectives, always remain the responsibility of the peak coordinator. This, of course, does not preclude the development of policy by a board of a committee or a legislature so that a group can, in certain instances, replace the peak coordinator. Once the policy has been established by the coordinating authority, however, it is binding on the agency that is charged with the responsibility for the procedural plan.

Under the permissive concept of authority, authority inheres in the organization rather than in the person of the peak coordinator, and the theoretical nature of both delegation and decentralization is considerably modified. The permissive concept of authority *"states the broad objective and permits groups to approach it by their own methods"* and it *"has the great virtue of releasing to the full the self-regulative forces of an organization, the tendencies people seem to have of getting on with each other and of cooperation in a task they can comprehend, which find expression in innumerable ways and through innumerable channels"*.[13] In contrast, there are the other types of authority which depend on command control which *"by restricting the method of approach in addition to defining the objective run the risk of failing to enlist these spontaneous self-regulative forces"*.[14]

RELATION TO DELEGATION

Delegation can be defined in two ways depending on the philosophy of authority within the organization. In the highly centralized organization the substantive plan rests in the peak coordinator. Delegation is necessary only to obtain the advantages of division of labor in the procedural-executory plan. This distinction is of theoretical value only, if decisions are made at levels other than the top because there are no decisions that do not have some elements of value. Pure delegation, in other words, tends to abstract these

value elements from the decision-making environment of the subordinate and the result is the almost exclusive utilization of command as the technique of control.[15] Predictability is, however, extremely difficult to achieve because any decision is subject to reversal by the chief executive if it does not accord with his own personal objectives. This type of an organization is truly nothing but the lengthened shadow of one man. The quality of contributions by participants is of a low order: ". . . *command increases the opportunity for the controller to attain his goals at the expense of the subordinate's opportunities. The subordinate must do the bidding of the controller or suffer punishment; the subordinate's own goals—aside from his desire to escape punishment—are neglected*".[16]

In the substantively decentralized organization, where the price mechanism serves as a partial substitute for hierarchy, delegation is still present. Here, however, the organization is consciously constructed of a number of decision-making divisions. Delegation still characterizes the hierarchy within the division although it need not be as rigid as the kind described above. If we look at the organization as a whole, the focus is not wholly toward one supreme coordinating authority, but rather toward a number of lesser hierarchies, all contained within the one larger one.

Orientation of participants, at the division level, is not toward an individual but rather toward the organization. The mere fact that decentralization has occurred within the organization, that not all coordination is directed from the top, is an admission that spontaneous and manipulated field control and reciprocity are superior to command as control techniques. Command control fails because its sanction is the fear of punishment; even in the "perfect" hierarchy of the military, as indicated earlier, more emphasis is placed on leadership, morale, esprit de corps—"*enthusiasm, and jealous regard for the honor for the group*"—than upon discipline. Where the participant is free to leave the organization at will (typically not the case in the military) these intangibles have an even more important role to play.

If the real problems of coordination in the large organization are "*to make leadership and the exercise of authority operate according to the accepted values and beliefs of our society*",[17] then the command technique of control fails to meet the test. On the other hand, the other techniques of control, especially spontaneous field control and reciprocity, do accord with the accepted values of society. The distinction between command and reciprocity and their pertinence to the substantively decentralized organization are well presented in the following.

> *Unlike command, reciprocity need not inherently limit the freedom of any participant. But wherever there is less than complete agreement on goals among the participants in a reciprocal arrangement someone's freedom is bound to be restrained. Hence reciprocity is mainly important to freedom as a system for arriving at decisions as to whose freedom will be permitted or curtailed, and by how much, in cases of conflict.*[18]

It is evident that decentralization can range all the way from delegation in the traditional sense to something approaching actual independence, depending on the goals and concepts of the controlling management group. Whether the divisions are organized as subsidiaries or as organic parts of the corporation is not material. What matters is the degree to which the divisions are in a position to formulate their own substantive plans within the constraints contained in the expressed policy of the supreme coordinating authority. If the price mechanism is to serve its objective function of coordination, the supreme coordinating authortiy must rely increasingly on the judgements of the division managements. A permissive concept of authority is necessary; command control jeopardizes the pecuniary measure of performance as well as the nonpecuniary inducements offered to participants by the firm.

COMMUNICATION OF POLICY

As the organization grows in size, the functions of the supreme coordinating authority fall logically into two areas. The supervision of executive personnel and of financial matters becomes almost a routine. The other, and more important function of top management, is much vaguer and varies widely from firm to firm. This function embraces the communication of advice and policy to the divisions and subsidiaries. Since the effectiveness of divisional managements is evaluated by means of the measure of performance, the home office must permit them a considerable amount of leeway in their substantive plans in order to preserve objectivity. In large and widely dispersed organizations such as General Motors, Unilever, and Standard Oil of New Jersey, the top management relies heavily on the training, experience, and judgement of the contact directors. As the eyes and ears of the supreme coordinating authority, they must be thoroughly familiar with operations in their area of responsibility, but because they do not exercise command authority, they must be able to "*discuss without dogmatizing, suggest without ordering, and, except when required by law, guide without pointing an absolutely fixed way.*"[19] It is evident that they must utilize spontaneous and manipulated field control and reciprocity, rather than command, as the techniques of influence.

Military organizations long ago recognized the need for a function resembling that of the contact director in a large corporation. The liaison officer, who may represent an adjacent, a supported, or supporting unit. . . ."*must keep in mind that he is responsible for furthering harmonious cooperation between his own headquarters and the one to which sent. To do this, he must accomplish his mission without interfering with the operations of the headquarters to which sent.*"[20] The contact director, in addition to liaison duties, also performs duties closely related to those of the inspector-general in the military. In addition, his burden is lightened by procedural control methods such as the financial and management audits as well as the entire gamut of staff functions.

In order to augment the influence of the top management, it is often the policy to "*move promising men from affiliate to parent company and sometimes back again.*"[21] This assures an operating point of view at the general office level and, in turn, results in the relevance of policy. In General Motors, for example, where most of the members of top management have had operating responsibilities, "*no important policy is made without consulting the divisional executives affected by it*" and "*it is the right as well as the duty of every managerial employee to criticize a central management decision which he considers mistaken or ill-advised.*"[22] An understanding of the problems faced by

Fill your job or get your job through an advertisement in *ADVANCED MANAGEMENT*

operating components at the home office level, combined with consultation and liaison with operating official, assures that promulgated policy is both workable and acceptable. This is in contrast to the highly centralized and personally oriented philosophy of firms such as Ford Motor Company, United States Steel, and Montgomery Ward (of an earlier time) in which policy was on a "take it or leave" basis.

An organization may sometimes be permeated with the command concept of authority because the peak coordinator has never had experience at the operating level. This appears to have been the case with Gary in United States Steel and was true of Avery in the Montgomery Ward organization. This deficiency in the background of the peak coordinator is remediable as long as there are members of the executive group who have had that opportunity, provided that their viewpoints are considered in the formulation of policy. In Standard Oil of New Jersey, for example, one of the most important methods of influencing the operating subsidiaries is through the Coordination Committee and the coordinating (staff) departments supervised by the members of the Coordinating Committee. The success of this committee depends on the fact that, on a given issue, its members know more than the operating officials do, although the latter are always permitted to express their views before it. The success of many former high ranking military officers as corporate officials is at least partially due to the fact that they are experienced in group coordination, despite their initial lack of operating knowledge, and hence able to contribute to representative policy.

In a theoretical sense, substantive decentralization may be possible even without group coordination at the top management level. In a practical sense, however, the modern large corporation is so complex that no one man can know every aspect of every issue facing the organization. Reliance must be placed on subordinates, and they must be tested in commands of their own if there is to be perpetual succession of the leadership. Contrast the following statement with what would have been the position of the elder Henry a decade ago. In the recent reorganization of the Ford Motor Company, Henry Ford II announced that Ernest R. Breech, "*in his new position of board chairman will continue to share with me, as president and chief executive officer, the basic management responsibilities and decisions of the company.*" The creation of the new position was occasioned by the rapid growth and increased diversity of the company in recent years; "*this increased breadth and depth of the company's operations demands closer executive supervision and direction and a wider spread of the heavy and growing management responsibilities in all quarters of the company.*"[23] As was the case with Standard Oil of New Jersey and General Motors, this attitude is an acknowledgement that Ford Motor Company has reached the size where peak coordination must become a shared responsibility. This has occurred despite the fact that the firm has relied heavily on substantive decentralization to lighten the administrative load of the central management.

FINANCIAL CONTROL

Control of the purse strings remains the most important control of the supreme coordinating authority over the divisions in the substantively decentralized corporation. The finance function is almost always a responsibility that is retained by the central management.[24] In Standard Oil of New Jersey, the holding company has been likened to a "*great big bank*" with whose aid "*the affiliates have financed the greater part of their expansion out of earnings.*"[25] In General Motors, "*The divisional manager is relieved of all worry over financial matters.*"[26]

The fact that the finance function is centralized in the supreme coordinating authority is highly significant. The problems of coordination at the divisional levels are considerably reduced because their managements are not concerned with the financing function in any substantive sense; when funds are needed they are available from the home office. Similarly, at the top level, the difficulties of coordination are considerably reduced. If the divisional measure of performance (to be discussed in a later article) is attained and maintained or surpassed, top management need not, and should not, concern itself with the way in which the division is managed except to make sure that the policy guidelines of the supreme coordinating authority are followed. In effect, where a true permissive concept of authority prevails, this means that the supreme coordinating authority "takes a look" at the operations of the division at the end of each relevant budget period.

Centralization of the finance function ties in very closely with the survival and growth motivations of the corporation as an institution. Centralization of this function permits the supreme coordinating authority to establish the directions of growth of the organization. This implies also that coordination of product research and development should be located at this level. The relation between these two function is clear, given survival and growth of the organization as the substantive goals of management. As Knauth has pointed out "concern for the future" rather than "concern for the present" is the earmark of "managerial enterprise."[27] From this point of view, the dynamic nature of growth requires that the supreme coordinating authority serve as the central resource allocation agency, if an optimum allocation is to take place. Decentralization of the finance function would often result in less than an optimum allocation because of expansion into areas where rates of return are smaller. The ability to see the overall rate of performance and compare it with the rate of performance of the components is thus one of the very real advantages of centralized financing, especially when sound budgeting policies are followed. The matter of deciding when to embark upon the production of new products and when to cease making old ones is so closely related to the financial position of the firm that the two together may be said to comprise the substantive long range plan of the organization.

Liquidity is similarly a substantive concept because of its immediate relation to the survival of the profit making organization. Where a high degree of substantive decentralization prevails, financial autonomy of divisions, because of varying rates of receipts and expenditures, might well result in a huge surplus of funds in certain divisions while other divisions were experiencing severe stringencies. The centralization of control over funds, especially where a number of commodities is produced, reemphasizes the fact that the firm is in the banking business and that control of funds should therefore be the responsibility of the supreme coordinating authority. No matter how important concern for the future may loom in the minds of management, survival (concern for the present) requires a decision-making agency to allocate cash resources on some sort of a marginal

basis. Since the budget is the means by which the preesnt and the future are linked together, it follows that the finance function should be much more centralized than is necessary in the case of most other functions. In financial terms, the supreme coordinating authority can be conceived of as a credit and investment rationing agency because of the concern for the future and as a cash rationing agency because of relevance of the present to the future.

THE DISAPPEARANCE OF PERSONAL AUTHORITY

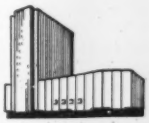
Schumpeter's analysis of the system of authority within the large organization draws its philosophical foundations from the era of feudalism. He asserts that *"unquestioning obedience (of the workman) within the individual firm . . ." was "due to discipline inculcated by the feudal protective stratum, by accepting equality in the political sphere, by teaching the laborers that they were just as valuable citizens as anyone else, the bourgeosis forfeited that advantage."* Because of this, *"gone are most of the means of maintaining discipline, and even more, the power to use them."* As a result, *"the picture is completed by the attitude of the hired business executive who, knowing that if he claimed to be fighting for a public interest he would not even arouse indignation but only hilarity, concludes that it is most pleasant to be commended for his progressiveness—or to go on a holiday—than to incur obloquy or danger by doing what nobody admits to be his duty."*[28]

Schumpeter's description of the erosion of the command concept of authority has a certain prophecy; there is no doubt that the prevalence of this type of control has been in a state of decline during roughly the last century. His theory appears to be too deterministic however; the end result, as Schumpeter sees it, is a shift of command control from the individual to the personified socialistic state. Today, "hired business executives" fight strenuously for what they believe to be the "public interest" and conceive of themselves as a body mediating conflicting interests among the various corporation participants. The increase in worker productivity that Schumpeter himself mentions and the belief of unions, at least in the United States, in the social advantages of present-day capitalism, indicate that the change in the philosophy and structure of the authority system in the large

HOW WILL YOUR OFFICE LOOK IN 1970?

For a preview of the office of the future, don't miss this year's National Business Show in the vast, new New York Coliseum. Only the world's largest exhibition hall could house this gigantic show. The wonders of tomorrow and acres of ideas you can use profitably today.

NATIONAL BUSINESS SHOW



October 15 through 19th
1 to 10 P. M. Daily
New York Coliseum

• *For information and hotel reservations*
RUDOLPH LANG, *Managing Director*
33 West 42nd St., New York 36, N. Y.
PEnnsylvania 6-6760

S.A.M. Research Publications . . .

A survey of

TIME STUDY POLICY AND PRACTICE
in the U. S. and Canada

A quantitative analysis of:

- **297 Plants**
- **180 Companies**
- **17 Industry Classifications**

This is a report issued January 1955 by the SAM National Research Committee on The Project, Aptitude and Proficiency Tests for Time Study Personnel.

Price $1.50 *per copy*
Limited Quantity Available

COLLECTIVE AGREEMENTS ON TIME AND MOTION STUDY

by G. Jay Anyon, Ph. D.

Simplify negotiations with this handbook in which over 300 separate types of stipulations throughout a broad sampling of American industry are examined.

SAM Members: $3.50
Non-Members: $4.50

CREATIVE TIME STUDY AND METHODS

A collection of 21 articles concerned with the latest developments in the Industrial Engineering field.

SAM or ASME Members: $3.50
Non-Members: $5.00

A FAIR DAY'S WORK

- *Rating Judgments on 24 Typical Operations in Manufacturing*

The most comprehensive research ever undertaken in the field of performance rating.

SAM Members: $7.50
Non-Members: $10.00

Order from:

THE SOCIETY FOR ADVANCEMENT OF MANAGEMENT
74 Fifth Avenue,
New York 11, N. Y.

organization has resulted in an industrial society far different from that predicted by Schumpeter.

It must be pointed out that the permissive or reciprocal pattern of authority does not affect the substantive definition of authority which is implicit in the organizational objective. There often *"are times of crisis for the entire organization when it is fitting and necessary that authority be exercised from the centre; this authority is granted,"* but *"without doubt, it is always healthier and more efficient if, in day-to-day affairs, authority resides at the periphery, in the hands of those who are locally responsible."*[29] In this context, authority is exercised through power only when the survival of organization is threatened. In the general case, however, discipline is based on participation and identification rather than command and dictate as in the case in societies in which authority has a customary foundation based on rigid social statification and orders are unquestioned and unquestioningly obeyed.

In summary, while this discussion has centered around the large corporation, the lessons that can be drawn from it apply to all sizes and kinds of organizations. It is true that most small firms cannot afford a policy council of highly paid executives. Nonetheless, the evidence does indicate that sharing in decision-making results in identification and that identification improves the quality and quantity of the contributions of participants. This conclusion has significance because of its close correlation to the contributions of the human relations literature. Empirical studies have shown that those work groups with an "employee oriented" supervisor who exercises "general supervision" have the highest outputs.[30] It is rather significant that an approach which works down from the policy level of the organization should yield similar conclusions. In a forthcoming article some of the implications for a general theory of administration arising out of this mutual relationship will be discussed. ■

---

[1] *Herbert A. Simons,* Administrative Behavior, (*New York: The Macmillan Co.,* 1948)

[2] *Robert A. Dahl and Charles E. Lindblom,* Politics, Economics and Welfare, (*New York: Harper and Brothers,* 1953). *It is the opinion of this writer that this volume is "must" reading for the student of advanced management.*

[3] *See the comments that were made about this principle by the writer in "The Span of Control—Fact or Fable," this journal, November* 1955, *pp.* 8-12.

[4] *Herbert A. Simon, "A Comparison of Organization Theories,"* Review of Economic Studies, *XX* (1952-53, *p.* 41.)

[5] Ibid., *p.* 40.

[6] *Alfred Marshall,* Industry and Trade, *2d. ed., (London: Macmillan and Co., Ltd.,* 1947), *pp.* 310-311.

[7] *Joseph Schumpeter,* Capitalism, Socialism, and Democracy, *3rd. ed., (New York: Harper and Brothers,* 1950), *p.* 145.

[8] *For a more complete discussion of the various control techniques see Dahl and Lindblom,* op. cit., *pp.* 98-99.

[9] *For a detailed discussion of the various types of authority which antedate permissive authority, see Robert Dubin,* Human Relations in Administration: The Sociology of Organization, (*New York: Prentice-Hall, Inc.,* 1951), *pp.* 195-198.

[10] *Schumpeter,* op. cit., *pp.* 213-214.

[11] *Walter Bagehot,* Physics and Politics, (*New York: D. Appleton and Co.,* 1876), *p.* 161.

[12] *Jerome F. Scott and R. P. Lynton,* Three Studies in Management, (*London: Routledge and Kegan Paul,* 1952), *p.* 163.

[13] Ibid., *p.* 163

[14] Ibid., *pp.* 163-164.

[15] *Cf., Dahl and Lindblom,* op. cit., *pp.* 99-126.

[16] Ibid., *p.* 123.

[17] *Dubin,* op. cit., *p.* 230.

[18] *Dahl and Lindblom,* op. cit., *p.* 122.

[19] *"The Jersey Company,"* Fortune, *October,* 1951, *p.* 178.

[20] *U. S. Department of the Army,* Staff Officers Field Manual: Staff Organization and Procedure, *FM* 101-5, (*Washington: Government Printing Office,* 1950), *p.* 56.

[21] *"The Jersey Company,"* op. cit., *p.* 178.

[22] *Peter F. Drucker,* Concept of the Corporation, (*New York: The John Day Co.,* 1946), *p.* 61.

[23] *"Breech Named First Chairman of Ford Motor,"* The Wall Street Journal, *January* 26, 1955, *p.* 6.

[24] *Ernest Dale,* Planning and Developing the Company Organization Structure. *Research Report No.* 20, (*New York: American Management Association,* 1952), *p.* 117.

[25] *"The Jersey Company,"* Fortune, *October,* 1951, *p.* 175.

[26] *Drucker,* op. cit., *p.* 53.

[27] *Oswald Knauth,* Managerial Enterprise, (*New York: W. W. Norton and Co., Inc.,* 1948), *p.* 33.

[28] *Schumpeter,* op. cit., *p.* 214.

[29] *Scott and Lynton,* op. cit., *pp.* 164-165.

[30] *On this point, see the following publications of the Institute for Social Research, University of Michigan, Ann Arbor, Michigan: H. Baumgartel,* The Survey Feedback Experiment, 1953; *D. Katz* et al, Productivity, Supervision and Morale Among Railroad Workers, 1951, *and D. Katz* et al., Productivity, Supervision and Morale in an Office Situation, 1950.

There is a similarity between sales quotas and the concepts of planning, control and standards of performance developed by Frederick W. Taylor, father of scientific management, and his followers. These concepts are being developed more and more in the field of marketing, and the author points up the growing feeling among sales managers that standards must also be applied to sales as well as production.

Use Of Sales Quotas By Manufacturers

By Donald R. Herzog

Manager, Marketing Research
The Aro Equipment Corporation
Bryan, Ohio

THERE is general agreement among noted marketing authorities that the rise of scientific methods in marketing followed soon after World War I. The postwar period stimulated management to analyze their markets. Methods which had proved effective in production were sought and studied to determine the possibility of their use to increase marketing efficiency. It has been estimated that fifty-nine cents out of every retail dollar represents cost of distribution.[1] This cost of the distribution of goods has led sales managers to devise new methods for controlling sales activities with a view of increasing efficiency in distribution efforts. One of the devices that has been evolved is a system of sales control aimed at reducing costs. One particular development in the area of sales control is the use of sales quotas. The sales quota is in a sense an application to marketing of part of the philosophy of scientific management.

Sales quotas are not new, but their value is becoming recognized. The prevalence of the use of salesman's sales quotas is shown in a study of compensation plans made in 1947.[2] Of 407 firms which furnished information, 182 or 44.7 per cent set quotas for individual salesmen. Of the total, 23 firms or 5.7 per cent stated that their practice varied, and 202 firms or 49.6 per cent answered in the negative. Use was most dominant among firms which handled building materials, foods, machinery metals, paper, rubber products, and textiles. It was least dominant among firms which handled auto parts, chemicals and drugs, electrical equipment, petroleum, and printing and publishing. While these data on use are not conclusive, they do indicate that sales quotas are in wide use by many firms which manufacture diverse goods.

The material that follows shows some of the specific applications of sales quotas.

Modern marketing management is beginning to make profitable use of a military principle. Military leaders have realized for centuries that it is impossible to arrive at any given place without first deciding upon that place. A naval commander using cruisers, carriers, destroyers, and attack transports may assign ships to tasks in his plan of action, but the objective, let us say, is to occupy island X-ray and Yoke within three days. This is the objective to be achieved by coordinated employment of all naval ships and equipment. Today salesmen, too, are assigned a part by the sales manager in his plan of achieving a certain sales objective within a specified time.

A sales objective is a prerequisite for success. It may be defined as a goal for the enterprise at hand. Salesmen will usually agree that a clear statement of the amount of business they are expected to produce in a given time is to their own interest as well as to that of the company. Sales objectives almost invariably take the form of yearly sales quotas of merchandise distributed. The extent of market cultivation, nature of the product, local conditions affecting competition, and general business conditions have to be taken into considera-

DONALD R. HERZOG

Mr. Herzog was an assistant at the Bureau of Labor and Management at the University of Iowa before going to his present job with The Aro Equipment Corporation. Prior to that he was a Market Research Analyst with the W. A. Sheaffer Pen Company. He is a member of the Society for Advancement of Management and of the American Marketing Association.

[1] *Paul Stewart and J. Frederic Dewhurst,* Does Distribution Cost Too Much?, *pp.* 334-335.

[2] *National Industrial Conference Board, Inc., "Salesmen's Compensation Plans,"* Studies in Personnel Policy, *No.* 81, *p.* 12.

tion when sales quotas are established.

Sales quotas should take into consideration the market potentials of the sales territories. They should not be set so high as to be impossible for the salesman to attain; adjustments should be made constantly according to changing business conditions.

The measurement of market potential is only one part of the scientific approach that is being developed in an attempt to make sales quotas more accurate. The accurate measurement of market potential is valuable in a number of ways. A necessary foundation is furnished, and goals are set up for the business as a whole. Potential sales are essential in budgetary control, in expected standards of performance, and in the salesman's compensation. Weak spots of distribution are located and eliminated. Thus, an accurate picture of the market is secured and the proper amount of advertising and sales effort is determined.

The salesman's sales quota may be used to reveal the measured task to the salesman. It serves to define the job. It is a conservative statement of what the salesman is expected to do as his part in the company's program. Stated otherwise it is that job assignment which, if carried out by every salesman, would probably yield the sales volume which the company expects to achieve during the time period specified. It is probable that some salesmen will fall short of such an assignment, and likewise some will exceed it.

SALES quotas give sales management a basis for judging the efficacy of its sales operations, and also to compare actual progress with what it ought to be. Before adopting a quota, a manufacturer must consider the size of the manufacturing operation, the duration of its establishment, the competition it must meet, its ability to hold its selling force and the nature and the methods of distributing its product.

Factors which influence sales quotas and sales performance are listed by the National Industrial Conference Board as territorial factors, new account development, nonrepeat and windfall business, home office or national accounts, and point of purchase versus point of use.[3]

A system that can be used by manufacturers who use both territory sales quotas and sales operating expense budgets to indicate weak and strong performance is the coordinate system for plotting arithmetic graphs. Data on sales operations may be prepared for districts, regions, territories, and individual salesmen, and put in graphic summaries by means of a scatter diagram. This may be done by constructing a diagram such as those shown in Figures I and II.[4]

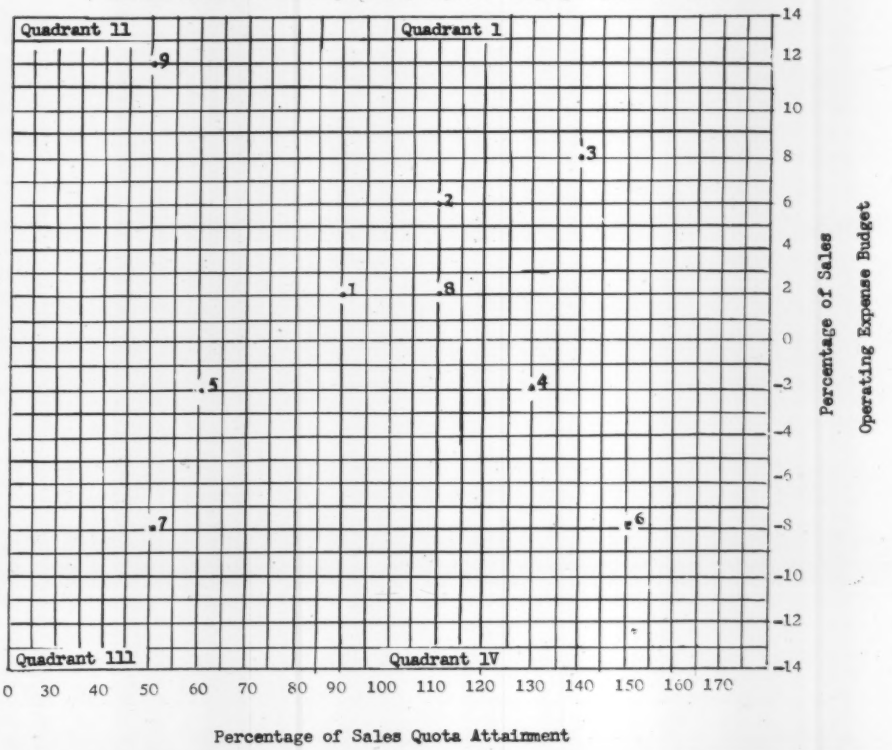
It will be assumed that the manufacturer distributed through nine regions with ten territories in each region. Through the use of the diagram, four types of situation are depicted. First, in quadrant I are those regions whose costs are over the budget and whose sales are over quota; second, in Quadrant II are those regions whose costs are over the budget and whose sales are under the quota; third, in Quadrant III are those regions whose costs are below the budget and whose sales are below the quota; and fourth, in Quadrant IV are those regions whose costs are below the budget and whose sales are in excess of quota.

In Figure I, the performance of each of nine regions is shown. Two standards of comparison are used—the regional sales quota for sales performance and a budget for cost operations. It will be seen that Region 9 shows the weakest over-all performance and Region 6 shows the exceptional over-all performance. It is evident that Region 9 is having serious trouble in attaining sales volume and keeping expenses down. In comparison, Region 7 has kept its expenses in check, but for some reason sales are far below quota. Region 3 has costs in excess of the budget which are somewhat justified because sales exceeds quota. Regions 1, 8, and 4 are about normal in both expenditures and territory sales quota attainment.

In those regions where poor performances are shown, a further investigation is in order to find the territories within the region causing the poor performance. In this instance, Region 9 would probably receive immediate attention. It will be remembered that each region is composed of ten territories. The same procedure as used in the regions can now be followed in making an analysis of the territories. Figure II shows the situation in Region 9. Of the ten territories, one (f.) is doing above

Figure 1

(National(Coordinate System of Plotting Territory Sales Quota Attainment With Sales Operating Expense Budget, September 1955



[3] *National Industrial Conference Board, "Measuring Sales Performance,"* Studies in Business Policy, *No.* 31, *pp.* 2-3.

[4] *The following presentation is adapted from the article by Ray R. Eppert, "Better Marketing Through the Office,"* National Office Management Association Forum, *Vol.* 25, *No.* 9, *September* 1950, *p.* 8

average performance. It is doing plus ten in sales quota attainment and minus four in expenditures. Six territories (a, b, c, d, e, and j) deserve primary attention.

Now that we have isolated the poor performance territories we can carry our analysis further in making a customer analysis, tracing the salesman's routes in covering the territory, analyzing expenses in serving the territory, reviewing advertising, and making any other analysis deemed necessary by the sales executives or market research manager.

The statistical quality-control system in a shop or factory may disclose that remedial action is needed in the production process, and similarly the use of territory sales quota facilitates a diagnosis of the distribution process. The industrial engineer must make an investigation of the variables affecting production to find the cause of the weakness and to devise remedial measures. Likewise, sales management must hunt for the origin and the cause of the weakness in the distribution process.

It is particularly useful for sales managers to have the territorial sales quota broken down into months or quarters for detecting weak spots. By using a short-time quota, the sales manager can detect weak spots and take action before serious trouble occurs.

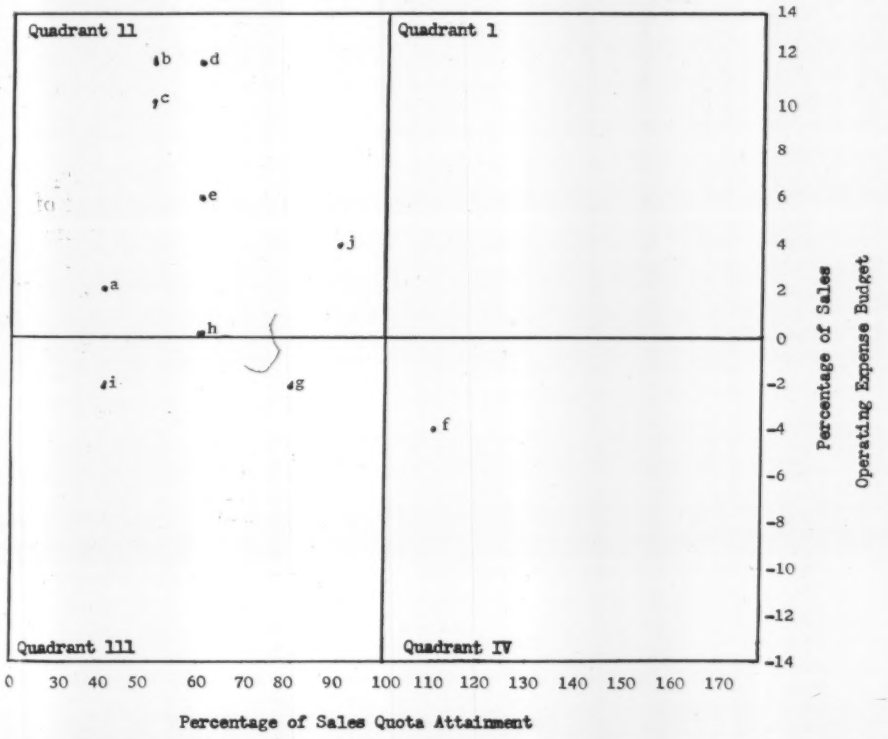
The sales budget should meet the requirements of the desired sales quota. Before the sales budget is estimated, various other budgets and past records should be studied.

On the basis of the sales estimate or sales quotas, the production manager estimates the quantity of raw material needed and the cost of securing it. On the basis of this estimate the purchasing agent plans his schedule of procuring materials. The financial budget, administrative budget, and other budgets are worked out on the basis of the sales estimate or sales quota.

With the increase in the application of scientific methods to the selling end of business, there has been a constant growing recognition that production and selling are complementary operations. Neither sales quotas nor the production program should be made up independently. When sales quotas are formulated they should serve as a guide to the production manager,[5] allowing him to reduce costs, produce a better quality and more uniform product, and keep his inventory requirements to a minimum.

Figure 11

(Region Number 9) Coordinate System of Plotting Territory Sales Quota Attainment With Operating Expense Budget, September 1955



If the production department knows future sales, it can prepare its facilities during the year to meet future sales, and from this the sales department can make delivery date promises with assurance. In addition to stabilizing employment, it may decrease labor turnover.

Increasingly some companies are paying their salesmen a basic salary plus a commission on all net sales in excess of a certain quota. The results of a survey of salesmen's compensation conducted by Tosdal and Carson revealed that out of 1,243 companies there were 177 companies which used the salary plus commission above salesmen's sales quota to compensate their sales force. In 234 plans, sales quotas were used in the determination of commission payments, while in 603 plans no sales quotas were involved. Out of a total of 844 sales forces, sales quotas, work plans, or specifically assigned quotas were used in guidance.[6] Some sales managers link bonuses, prize contests and other incentives with the salesmen's sales quota.

SINCE the depression of 1929 many companies have adopted methods to rate their sales force. The industrial engineer and personnel manager have long recognized the need for job evaluation of production workers. The sales departments are also using the job evaluation technique for rating the salesman's performance. An activity quota in addition to the sales quota will greatly enhance the merit rating plan, because the sales executive has more than one element with which to measure the job performance of the salesman.

A relatively new use of the territory sales quota is seen in its application as a basis for determining manpower requirements and assigning the sales force. Many companies study their distribution of salesmen in relation to territory sales quota, with the result that additions are made in some territories while in others the number is reduced. Thus it brings manpower requirements into proper balance with what their territories warrant.

An established company or a new company is usually confronted with the problem: What products should be added or eliminated from the line? Some manufacturers have found that simplifying their line results in worthwhile dividends. General Motors found

[5] *Usually, production and sales plans are coordinated through the planning department.*

[6] *Harry R. Tosdal and Waller Carson, Jr.,* Survey of Salesmen's Compensation, *pp.* 7-14.

that 70 per cent of the parts of an automobile are minor in nature and that many are easily interchangeable with different models.[7]

Most products are not marketed singly and their individual sales depend to a considerable extent upon their relationships with other products being sold. The tendency toward full utilization of plant capacity, marketing facilities, and more complete use of raw materials has caused some firms to increase volume by adding supplementary products to those already handled.

Diversification and simplification have received considerable attention from both the production department and the sales department. In many companies committees have been formed to decide whether products should be added or eliminated from the product line. A measure often used by companies to decide whether items should be eliminated is that of comparing the amount sold in relation to the quota. It often happens that product sales quotas show wide variations. The decision of whether a product should be added involves the possible amount to be sold of this item. The fact finding and quantitative analysis necessary to set quotas aids management in making a decision whether the desired quantity can be sold. Product sales quotas can be assigned to the salesman to sell that quantity and balance sales in the line.

Companies selling a number of products or classes of products are usually more interested in the sale of certain products than they are in others. This preference may be due to the fact that some items yield a long profit, and competition in some lines is keen. Special effort may be needed to introduce a new product. The company may give consideration to these conditions by setting the quota for each product separately, by varying the weights on different products or on different product lines.

THE capacity of the factory should be considered in setting product quotas. There is a minimum volume below which it is unprofitable for a factory to operate.

The improvement of an old product or the production of a new product will usually affect product sales quotas by stimulating sales volume. Diversification also may necessitate change in product sales quotas. Careful consideration should be given to the influence of product policy on the quota.

Selling to certain types of customers may cost so much that a company loses money. Many companies lose sight of the high cost of obtaining and filling small orders, because they are only thinking in terms of more sales volume. To get an insight into the company's business by order size, an analysis of invoices should be made.

The cost of obtaining small orders may be as high as the cost of obtaining a large order in view of the time spent by the salesman. The small account must be recorded and the credit and collections department must serve these small order buyers with as much time and expense as if larger orders were involved.

PROPER designing of customer's sales quotas will reduce or eliminate losses from small orders and show the sales organization where to concentrate its effort for best results at lowest cost. Quotas may be set for orders of various sizes. There is an application of direct selling effort to selective distribution. A manufacturer that establishes customer's sales quotas can select the profitable customers and direct his selling effort on them rather than on the small unprofitable customer.

Before such quotas are employed it is necessary to consider variation in territorial patterns. Salesmen covering rural territories and small towns are likely to have more small orders than salesmen covering a large city in which the order per account is higher.

When governmental restrictions are placed on raw materials for civilian use, it is possible to use customer's sales quotas as a basis for making allocation to customers. There is usually some freedom operating within governmental regulations in terms of accepting and filling orders. It is normally the policy of manufacturers to distribute their civilian production as equitably as possible. This allocation may be established by a customer quota based on a percentage of prewar quotas. These customer quotas can serve as a guidepost to assure impartial distribution of production. After the war the steel industry was unable to meet the demands of the automobile manufacturers. A quota method was then used in allocating products to their dealers. The dealer quota was determined by the manufacturer on the basis of performance relative to prewar quota.

THE use of sales quotas by manufacturers reflects the tendency of marketing men to use techniques and principles which will increase the efficiency of their selling forces. Many manufacturing concerns endeavoring to improve performance in the distribution of their goods and services use sales quota plans. Obviously, there is a similarity between sales quotas and the concepts of planning, control, and standards of performance developed by Frederick W. Taylor, father of scientific management, and his followers. These concepts also have been developed in the field of marketing. There is a feeling among sales managers that standards must be applied to selling as well as to production.

The sales quota is not a substitute for other techniques used to control and measure sales activity. It is an important technique or tool used by sales management to secure more efficient distribution of goods and services from producer to consumer. Sales quotas, it should be remembered, are useful as an aid, but they do not replace other techniques. In the final analysis, management decisions are based on judgment but quotas permit such judgment to be based upon informative facts. To this end quotas play a significant role in improving marketing policies, techniques, and practices. ■

S.A.M. MEETING DATES 1956-1957

Executive Committee Meeting—
September 22, 1956

Board of Directors Meeting—
October 27, 1956

Executive Committee Meeting—
February 16, 1957

Board of Directors Meeting—
April 27, 1957

Executive Committee and Board of Directors Meeting—
June 15, 1957

BIBLIOGRAPHY

1. Eppert, Ray R., "Better Marketing Through the Office," *National Office Management Forum*, Vol. 25, No. 9, September 1950.
2. National Industrial Conference Board, "Measuring Sales Performance," *Studies in Business Policy*, No. 31, 1948.
3. National Industrial Conference Board, "Salesmen's Compensation Plans," *Studies in Business Policy*, No. 81, 1947.
4. Stewart, Paul W. and Dewhurst, Frederic, *Does Distribution Cost Too Much?* Twentieth Century Fund, New York, 1939.
5. Tosdal, Harry R. and Walter, Carson, Jr., *Survey of Salesmen's Compensation*, Published by the National Sales Executives, Inc., 1951.

[7] *Harold H. Maynard and Herman C. Nolen*, Sales Management, *p.* 515.

Nobody Cares How Tough You Had It

By Allen Hewlett

Mr. Hewlett is currently engaged in Capitol Equipment Projects for a large cane sugar refinery in the U.S. He served as Superintendent and Chief Engineer of various sugar factories in Hawaii after graduation from the University of Hawaii.

WHENEVER a new executive employee is disgruntled about some of the established conditions he encounters, oldtimers are inclined to recall how much tougher things were when they first joined the company. No one denies that they had it tough, especially if they pioneered the business. But today is today, and what was yesterday is irrelevant and immaterial. The sad fact is that nobody cares how tough you had it. The newcomer is concerned with his own problems. About your personal ancient history, he couldn't care less. Nor can you expect him to.

The dissatisfaction of the newcomer —which in many businesses means anyone with less than twenty-five years of service—is not necessarily unreasonable. So under no circumstances belittle his complaints or arbitrarily label him a chronic malcontent. Resist any impulse to try to shame him into acceptance of unsatisfactory conditions by boring him with woeful accounts of the past. But if you can't restrain yourself, let us hope he is polite enough to refrain from saying: "Who the hell cares!" You may be sure that that's what he thinks.

Most of us tend to regard anyone who criticizes conditions which we have taken for granted as being guilty of disloyalty. We think he is a sorehead. But progress comes only because of somebody's discontent with things as they are. We may frown upon the criticism, but we eagerly accept the improvement in our own situation which comes about as a consequence.

Military leaders have always recognized the significance of the "gripe" and the loyalty of no soldier or young officer has ever been questioned because of it. Concern arose only when the griping stopped.

Extensive inquiry into the factors governing human productivity, conducted by the Institute for Social Research at the University of Michigan, has thrown new light on the nature of the gripe. In the absence of serious psychic disturbances, the man who gripes about his work, his boss and his company is better executive material than the man who either has no complaints (is emotionally subservient) or keeps them to himself (lacks courage to express them). There is evidence that the personality characteristics which dispose a man to expressions of criticism also are the very ones essential to competence.

Other studies tend to confirm the foregoing. It has been found that the more creative an individual is the more likely he is to be in conflict with his associates and superiors. There appears to be little correlation, however, between his creative ability and his relationships with immediate subordinates or with labor, except insofar as his actions are less likely to be motivated by insecurity. The social intelligence and sensitivity essential to either sympathetic or emphatic understanding of labor is not necessarily an attribute of the creative individual.

Suppression of criticism is invariably accompanied by equal or greater suppression of morale, productivity and progress. Too many executives fail to appreciate this fact. They take punitive action against the critic by a quarantine of silence, or by attempting to undermine or to belittle the abilities from which the critic's judgments arise, especially if his abilities surpass those of his detractors. Thus, they advertise their own fears.

If you have been more or less isolated in one company for many years, it is quite possible that the newcomer's frame of reference is more valid than yours and his sense of values more in accord with those of today. This is especially likely if your company is "conservative" in the sense that it reveres tradition.

Examine your feelings of antagonism toward the critical newcomer. Can you honestly say that they arise from your own loyalty to the company? Or is it because your personal sense of security is being disturbed? Is there a glass curtain between the oldtimers and the newcomers which prevent the latter from identifying themselves with the organization? If the answer to either of these is "yes," it may well be that the newcomer is in fact more loyal to the company than you are.

Many executives are inclined to evaluate a subordinate accordingly as he is critical or submissive rather than on the quality of his performance. In a company where this is the case, an employee's state of grace is chiefly if not exclusively contingent upon his submissiveness. Such a company is in serious danger of falling into a state of complacency with its attendant stagnation and costly inefficiency. Without criticism, there can be no vitality.

Regardless of the question of fairness, a policy of promotion from within can debilitate a company. As often happens, such a policy also becomes a policy of promotion on seniority. Then, indeed, there is inbreeding and degeneration for there is no place for new blood.

The spectacular growth which characterizes so many new enterprises arises not so much from a new technology or new markets as it does from new blood. The companies are not old enough to have acquired deadwood on the executive totem pole. So instead of summarily condemning the critical newcomer, regard him as a possible transfusion. He may be the shot in the arm your organization needs. ■

Work, Workers, and Work Measurement

By **ADAM ABRUZZI**

This new book presents a theory of work built around the ideas and results developed in Dr. Abruzzi's earlier book *Work Measurement.* After analyzing classical theories in terms of the "theory of games," Dr. Abruzzi examines the behavior problems of workers and discusses their effect on measurement procedures. New ideas about both *work fatigue* and *work skill* emerges, and Dr. Abruzzi shows how these two aspects of his theory are related. He concludes by relating his new work theory to the concept of automation and shows that it is verified by what happens in the automatic factory. **$7.50.**

Business Practices, Trade Position, and Competition

By **OSWALD KNAUTH**

"American business practice in its present state," the author states, "is the result of many decisions made by many men in solving the problems immediately confronting them." What are these problems and what are the various means by which businessmen and legislators attempt to solve them? This highly stimulating book shows how the present system has grown spontaneously, without regard to the classical theory of economics, and proposes a theory that fits the working of the economy today. **$3.00.**

Columbia University Press
New York 27, New York

CLASSIFIED

POSITIONS OPEN

SOUTH AMERICA

Large oil company requires training administrator in Venezuela with college degree. Minimum 10 years experience in training field including trades and supervisory skills training, having been head of training unit of organization covering full responsibility analyzing training needs, formulating and administering programs. Send complete experience details to Box 429-0.

INDUSTRIAL ENGINEER

Established Central New York State food processing industry employing 1,200 people offers opportunity for graduate engineer in its Methods & Standards Department. Diversity of projects in fields of incentives, standard costs and methods and equipment improvement. Minimum 1 year experience required. Submit detailed resume to Chief Industrial Engineer, The Nestle Co., Inc., Fulton, N. Y.

FOR WEST INDIES

SENIOR INDUSTRIAL ENGINEER

Expanding American-owned pioneer of the sugar industry seeks an imaginative young executive to coordinate industrial engineering activities, services and staff. He will play vital role in further modernization of harvesting methods and the improvement of transportation and loading procedures through mechanization.

Must be stable married man, age 32-38, with I.E. degree plus broad administrative Industrial Engineering experience in agricultural type industry. Flexible five figure salary with free housing and other perquisites of overseas living. (Our staff have been told of this opening.)

Describe executive skills when submitting resume and complete earnings record. Include examples of creativity and initiative in your management experience. Box 430-O.

PROFESSIONAL

BRUCE PAYNE
AND **ASSOCIATES** INC.
MANAGEMENT CONSULTANTS

WESTPORT, CONN.
NEW YORK—BOSTON
ATLANTA—CHICAGO—MONTREAL
RIO DE JANEIRO—SAO PAULO
MEXICO CITY

INSTALLATION MANUAL
on the
"UNIVERSAL PLAN OF JOB EVALUATION"

Partly published in two Ind. Eng. Magazines 1950 & 1955. Complete with forms, tables, charts, etc. (8½ x 11)

Order your copy Now $10.00

P. A. Belanger
Personal Consultant
8 N. George St., York, Pa.

Do it better . . .

by

THINKING CREATIVELY

The ***Creative Thinking Publications*** tell how to:

- Arrive at new and better ideas
- Cultivate ingenuity
- Cut down waste motion in thinking

Write for free prospectus to:

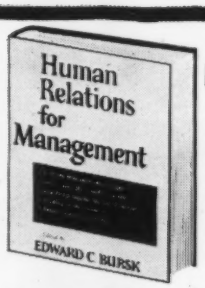
THE CREATIVE THINKING INSTITUTE

738 Sheridan Road, Chicago 13, Ill.

CHAPTER PERFORMANCE AWARDS REPORT

For period of July 1, 1955 - June 30, 1956

Hudson Valley	12396	Montreal	5631
Knoxville	10914	Columbus	5319
Providence	10170	Dallas	5303
Sacramento	9384	Worcester	5259
Washington	9370	Baltimore	5182
Lancaster	8814	Alabama	5181
Wilmington	8275	Richmond	5042
Greensboro	8079	New Orleans	5023
Philadelphia	7998	Lehigh Val.	4776
Western N.C.	7989	Portland	4605
Cleveland	7847	Madison	4579
Northeast. Pa.	7662	Georgia	3808
Bridgeport	7526	St. Louis	3724
Raritan Val.	7397	San Francisco	3073
Milwaukee	7326	New York	2922
Indianapolis	7253	Central Pa.	2277
Chicago	7207	Detroit	2201
New Haven	7061	Western Mass.	1538
Boston	7012	Central N. Y.	1512
Tren.-Del. Val.	6989	Hartford	688
Los Angeles	6873	Athens	454
Twin City	6751	Calumet	
Binghamton	6641	Charlotte	
Pittsburgh	6602	Cincinnati	
Kansas City	6521	Dayton	
Nashville	6479	Fox Valley	
Northern N. J.	6292	Long Island	
Reading	6266	Northern Ala.	
Greenville	6214	Puerto Rico	
Clearing	5637		



Important New Reading for Management . . .

HUMAN RELATIONS FOR MANAGEMENT

The Newer Perspective

Edited by EDWARD C. BURSK, *Editor, Harvard Business Review*

Distilled from the brilliantly edited pages of the *Harvard Business Review*, the material in this important new book is presented for businessmen to consider and apply. Each chapter was chosen to lend balance and well-rounded perspective to the whole. Chapters range from the Robert Wood Johnson report on Human Relations in Modern Business and other general studies, through specialized discussions of communication, administration, supervision, and personnel relations. The authors include, beside Mr. Johnson, such distinguished authorities from a variety of fields as Abram Collier, Wendell Johnson, Chris Argyris, Carl Rogers, F. J. Roethlisberger, Solomon Barkin, and Robert Ware Straus.

". . . more than good reading for policy-making executives; it's a road map that shows the way through what has been pretty confused traveling in recent years."—EVERETT VAN EVERY, *President, California Personnel Management Association.* **$5.00**

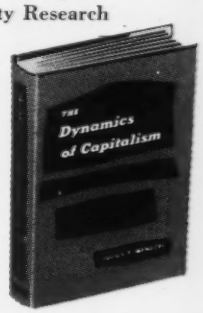
At your bookstore or from

HARPER & BROTHERS, N. Y. 16

THE DYNAMICS OF CAPITALISM

Correctives Toward Continuous Growth

By JULIUS T. WENDZEL, Economic Program Director, W. E. Upjohn Institute for Community Research



Proceeding from the conviction that capitalism is the best instrument for the job, this book shows how our system can assure an ever-increasing standard of living for our growing population. But certain correctives must be applied at the stress points of the American economy, and Dr. Wendzel offers a thoughtful analysis of measures to promote continuous growth — with a view toward encouraging vision and creativity and eliminating "drags" that cause deep depressions and economic breakdowns. A fresh, stimulating view of our economic system. $3.50

ADVANCED MANAGEMENT

reaches 30,000 readers each month

This space can be yours . . . to buy or to sell . . .

Ask for our rate card if you would like to reach our readers with your message.

Industrial and Management Research Unit

for Planning wishes to be included in the mailing list of publications relating to Industrial Management, Productivity, Planning, Human Relations, Work - Study, T.W.I., S.Q.C., Industrial audio-visual films, and other allied subjects. Address: ***imrup***, Bangalore, 1, India.